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VOLUME 37

IN THE SUPERIOR COURT,

State of California, County of Sacramento.

OCTOBER SESSION, 1881.

HON. JACKSON TEMPLE, - - - - - PRESIDING JUDGE.

WINFIELD J. DAVIS, OFFICIAL REPORTER.

SAMUEL OSBOURNE AND WILLIAM M. CUTTER, REPORTERS.

The People of the State of California,
vs.
The Gold Run Ditch and Mining Co. }

COUNSEL:

For Plaintiff,

HON. A. L. HART, Attorney General, GEORGE CADWALADER, ISAAC S.
BELCHER, A. L. RHODES, RICHARD BAYNE.

For Defendant,

J. K. BYRNE, W. C. BELCHER, S. M. WILSON, W. T. WALLACE, A. B.
DIBBLE, A. P. CATLIN.

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of the State of California
in and for the County of
Sacramento

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vs.	
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Winifred J. Davis
Official Reporter

In the Superior Court
of the State of California
in and for the County of
Sacramento.

The People of the State of California	} Afternoon Session
vs.	
The Gold Run Ditch and Mining Company	Thursday January 12 th 1882

Testimony
of
Thomas Price

direct resumed

Mr. Belcher In regard to one
question, as to the value or
the amount of gold produced
by the Coon Hollow mine
and the value or the amount
of gold produced by the Blue
Tent mine, I reserved the right
to make an offer. I now
make the offer to prove by
the witness, and we expect

he would testify if allowed, that, from the Coon Hollow mines over 5,000,000 of gold have been taken and that more than 10,000,000 remain in those mines to be worked; that the 5,000,000 have been obtained from about 40 acres in extent; that from the Blue Tent mines over \$1,300,000 have been produced, and that there remain in those mines yet to be worked over 10,000,000.

Mr. Hart. Our objection is the same: that it is irrelevant and immaterial, and also that it is already sufficiently proven.

Mr. Belcher I supposed that the objection would follow and be the same, and that the ruling would be the same. We reserve the exception in both cases.

In speaking of monitor state what is the difference between the apparatus that you found when you came to the State,

in use in hydraulic mines, with respect to pipes and these monitors or little giants?

A. Before answering that question, I ask the permission of The Court to make an explanation to this effect: that in my careful survey of different mines throughout the Counties, especially those on the American River, I might have overlooked some of them.

When I came here in 1862 I witnessed the operation of hydraulic mining at several places, and the pipes were then connected with a nozzle by means of a canvas hose. It was rarely over 250 inches of water was discharged through one nozzle. To control that water and hold that pipe in its place, so as to do its work, it was necessary to have as many as two and sometimes three men depending on the pressure and distance to put the

water. And then quite often
 the concussion of the air,
 coming right in, would jerk
 the hose and many men lost
 their lives by it. So that,
 at that time a claim using
 2000 or 500 inches of water
 would require nozzle to the
 number necessary to discharge
 the water. In a monitor such
 as now in use, the pipes are
 the same only it is connected
 with this peculiar machinery
 called a monitor which is
 easily handled and controlled
 One man can now control
 the discharge of 1000 inches
 of water. It plays upon the
 gravel, the water strikes
 against the gravel which
 is either in the bank or
 has already been blasted
 down and by these means
 the gravel is removed into
 the sluice. Where there were
 a large number of pipes
 before, using the same
 volume of water, there

would be then 10, 15 or 20 men necessary to guide the water by the old pipe, whereas now one man can do it.

The moment the material is removed into the sluice, the carrying capacity of the material that is carried away, depends entirely upon the size of the flume and the grade and the volume of water. A very large proportion of the time engaged in hydraulic mining at present, the pipe is not playing on the dirt at all. It is merely playing on the sluice, since the pipe will convey too much gravel into the sluice for the volume of water to carry away. So it is necessary for the pipe to be discharging its water apparently uselessly, in order to get the necessary volume of water. To better explain it: the same volume of water, say 1000 inches, falling over

a perpendicular bank on the gravel lying on the ground with the aid of a little more labor would convey precisely the same amount of material if not more, into the sluice, than can be done by the aid of the monitor. The quantity of the material depending entirely on the size of the flume, the grade of the flume, and the value of water at command, as well as the character of material of course to a certain extent.

2 Then if I understand you the difference, at least to a considerable measure, depends upon the character of the contrivance for governing and directing the pipe?

A Entirely. I consider the monitor nothing but a mechanical appliance.

2 A labor saving machine?

A A labor saving machine,

2. What is or has been

the cost of the property of

the Eldorado Water and Deep
Gravel Mining Company
Mr. Hunt. We object to that
as irrelevant and immaterial.
The Court. It is travelling over
the same line. You have testi-
mony already as to the value
of the mining property in
Eldorado County, and on the
American River I think, which
I understand is not to be
controversied.

Mr. Hunt. And it is cumulative.
Mr. Belcher. But Mr. Price has
had the control for some time
of this property and knows
exactly about it.

The Court. I think it hardly
of enough importance to go over
it again.

Ex. Mr. Belcher. Allow us an ex-
ception there. I do not
know just what the exact
figures are and reserve the
right to make the proper offer.
And I reserve the same with
reference to the Blue Tent
property.

What is the Extent, if you know of water ditches in the State?

A. A little over 6000 miles

2 Can you state approximately the cost of these water ditches?

Mr. Stant. We object to that as irrelevant immaterial and Cumulative

The Court. I think I will give you an Exception, Mr. Belcher.
Mr. Belcher. Subject to Exception with the same reservation with respect to that if we should desire to make the offer.

Is it practicable for these deep gravel claims or mines to be worked by any other process than the hydraulic?

Q No. The large number can be worked in no other way

2 If you know state the amount of capital invested in California mines and

the appliances for working them, including ditches?

A. About 150,000,000

Mr. Hart. We object to that as irrelevant and immaterial. The Court. Well, he has answered 150,000,000.

Mr. Belcher. In regard to a matter which I have reserved I find that I have before me a memorandum which will make the offer, as to the Eldorado Water and Deep Gravel Mining Company property, that cost has been 1,250,000 dollars, and of the Blue Tent Property \$800,000, and then we make the offer to prove by the witness and expect he would testified if allowed that the expenditures on these properties was on the one, \$1,250,000 and on the other \$800,000.

Ex. Same objection, same ruling and exception by defendant.

10482 Mr. Belcher State, if you

Know whether this capital
is home, or foreign.

Mr Hart. We object to that
as irrelevant, immaterial
and cumulative.

The Court. I will give you the
Exception Mr Belcher,

Mr Belcher. And in that
connection we offer to
prove that more than 19/20
of it is California Capital
Mr Hart. Make it as large
as you can.

Mr Belcher. I mean to make
it as I think the witness
will testify, if I can in ac-
cording to the facts.

Mr Hart. All right.

Mr Belcher. What effect upon
the civilization of the world
has been ^{produced} increased by the
increased supply of gold
since 1848 or say since the
beginning of this century.

Mr Hart. We object to that
one 2 or 3 grounds. First;
that it is irrelevant and
incompetent; second, that the

witness has not shown himself competent to testify in relation to it; third, it is a matter of which the Court will take judicial notice The Court. I will probably hear you on that subject, by and by, Mr Belcher. I will sustain the objection

Ex.

Defendant Excepted
Mr Belcher You have already stated in what countries mining is an industry. State now to what extent the population of those countries is dependant on that industry
Mr Hart. We object to that as being cumulative and as being a matter upon which we shall offer no rebuttal, and irrelevant besides

Mr Belcher If they admit that the population of these mining countries is dependant upon that industry, then of course we do not desire to offer the testimony

Mr Hart. You have offered

Evidence tending to show that. We do not intend to controvert your evidence. As to Eldorado County we expect to rely on the testimony of Judge Blanchard, for instance. Mr Belcher This is broader than Eldorado County. Mr Hunt. Yes. But you have proven in relation to Nevada County and the whole of the mining companies of the State by Mr Smith.

Mr Belcher Mr Smith only mentioned a comparatively small number of mining Counties of the State. Some of them he named.

Mr Hunt. Well, it is entirely irrelevant any way.

The Court. I thought before and think yet, as far as this matter is concerned, that every body is supposed to know as well as The Court in regard to it.

Mr Belcher It is a matter of testimony, of which the

Court will take judicial cognizance.

The Court. So far as it can be material.

Mr Belcher I say; so far as it may be material. That upon that question the means of information which the witness would have, if attorneys can bring it before the Court, the Court will receive it so far as material?

The Court. So far as material

Mr Belcher You came here in 1861
A 1862.

Q For the purpose of shipping ores to Europe? A Yes

Q Copper and Silver ores to Europe for production?

A And Gold ores

Q State, if you know, whether at that time there were any shipments of wheat to those countries? A No.

Mr Start. As you have answered it, I will let it go, but it is immaterial

Mr Belcher I say there

were none.

Mr Hart. We object to the Counsel asking the question over again on the ground that it is immaterial as well as a repetition.

Mr Belcher Do you know when wheat began to be shipped abroad from this State—State if you know when wheat began to be shipped abroad from this State.

Mr Hart We object on the ground that it is immaterial and irrelevant.

The Court. I do not see the relevancy of it.

Mr Belcher The relevancy is this: They have undertaken to show that farming as an industry began at a very early day here. What are you propose to show by the witness, if he knows, is this: That this State did not raise wheat enough to ship any abroad until 1867; that prior to that time, a very large

proportion or prior to two years before that a very large proportion of the flour and wheat ^{consumed} produced in this State came from abroad and that, in that year - in 1864 - we began first to ship it abroad to supply others.

Mr Hunt. How can that be material

The Court. The objection is sustained. I give you the exception. Mr Belcher Mr Belcher And the statement I have made will be taken as an offer to prove by the witnesses.

The Court. Yes sir

Mr Belcher Subject to my exception.

What was, if you know, the leading and principal industry of the State when you came here in 1862?

A Mining

2 What was the effect of mining as an industry upon

other industries of the State.
Mr Hunt We object as
 being a matter that the
 Court cannot take judicial
 notice of. We admit that
 gold is used as a circula-
 ting medium.

Mr Belcher This question was
 not intended for that.

Mr. Dibble Do you also ad-
 mit that it produces wheat,
Mr Hunt?

Mr Hunt. No sir. And I won't
 admit that wheat produces
 gold either. I will admit
 that gold buys wheat.

Mr Dibble You can not
 raise a bushel without the
 gold.

The Court. If that is what
 it is intended for, I will
 sustain the objection.

Mr Hunt. What is intended
 to be proven by this question.

The Court. That it is paid
 for in gold and the value of
 gold I suppose.

Mr Belcher No, I do not

propose to prove by this its
value in gold

The Court. That every thing
is valued in gold?

Mr. Belcher. I propose this,
by what I ask, & to the effect
of this industry on the other
industries; To show that
this being the first and
primary industry of the
State gave rise to others
and was the very industry
towards which all the rest
were directed, during those
earlier years; that the
farmer entered upon pro-
ducing for the purpose of
supplying the miners; that
the merchant came here
and sold his goods to
supply the miners; that
the mechanic, and all
craftsmen came here for
that purpose, and that
that was the industry
controlling all other in-
dustries in the State.

Mr. Hunt. There is a great

deal of that, the witness
 could not swear to.

Mr Belcher Well, if he
 could not, of course we could
 not prove it by him.

Mr Hart. I admit wheat
 is raised for the purpose
 of selling it and getting
 gold in return; that mer-
 chandising was conducted
 for the purpose of getting
 gold in return; that car-
 pentering was conducted for
 the purpose of getting gold
 in return; that all kinds
 of mechanical work, and
 all kinds of trades were
 conducted for the purpose
 of getting gold in return.
 And to that extent gold
 is a leading industry
 and has that much effect
 upon all kinds of trades
 and occupations.

Mr Belcher We do not
 ask for that kind of ad-
 missions

Mr Hart. Well, I do not

Know what else you can prove.

The Court. I do not see anything in the matter except what is already in. The number of the people engaged in mining in different places is already in proof and I suppose that everybody knows they have their necessities and wants which created a certain amount of market and demand for goods and work of different kinds.

Mr Hart. We will add to our admission, that the miners eat and wear clothes, and live in houses.

Mr Belcher. What would be the effect of discontinuing or stopping the mining in the State?

Mr Hart. We object to that as being a matter which is addressed to the judgment of the Court, and not to be determined by the witness, and as being irrelevant and in-

competent in every respect
The Court. I do not think it
 is necessary to go into that
Mr Belcher We offer to prove
 by the witness and expect he
 would testify if allowed in
 respect to the matter, that the
 discontinuing or stopping rather
 mining as an industry in
 the state, would drive out
 from the Counties engaged in
 that industry the entire pop-
 ulation, and that the effect
 of it would be to disorganize
 all those Counties which are
 devoted wholly and principally
 to mining as an industry.

Mr Hart. He does not know
 that any better than the bal-
 ance of us. I object to that
 upon the ground that it is
 an effort to prove a common
 sense proposition, which every-
 body knows

Mr Belcher And further that
 of the industries of San Fran-
 cisco and the Sacramento Valley
 one half are dependant upon

mining in those Counties where
mining is an industry at the
present time

Mr. Hart. That would be
cumulative. They have in-
troduced evidence showing that
the cities of San Francisco
and Sacramento have always
supplied the miners. We do
not doubt that

Mr. Dibble Now do not put
that in. We say that the
miners supplied San Francisco
and Sacramento to the extent
of 50 per cent of the entire
industry of both places. That
is slightly reversing the prop-
osition

Mr. Hart. They supply the gold,
and we supply the industry

Mr. Dibble No! They supply
those industries. They employ
those industries

The Court. I think I will
give you the exception on
that Mr. Belcher.

Mr. Belcher We except.

I you have been at the

Q

10494

Gold Run mine? A I have
 2 Did you observe there what
 is called the upper and the
 lower stratum?

A I did

2 And the color?

A Yes.

2 What is the color of the
 lower stratum?

A Dark bluish brown

2 And of the upper?

A Yellowish white

2 What is it that gives
 the color, the blue color, to
 the lower stratum?

A Protoxide of iron gives
 it the bluish color

2 Does the slate have any
 effect upon it?

A Yes, the effect of the
 slate is a bluish color owing
 to the presence of salts of pro-
 toxide of iron which it
 contains.

2 That is, of the protoxide
 of iron, contained in the slate?

A Yes.

2 A yellowish or reddish

color in the upper stratum?

A. It is due to the oxidation of iron from the protoxide to the peroxide.

Q. Did you go down the North Fork of the American from Cotton Creek to Rees bridge?

A. I did.

Q. And did you go above, either at that time or have you been at other times, the mouth of Cotton Creek, up the North Fork?

A. Yes.

Q. I think already you have named the Last Chance and Kanaka Hill?

A. No; the Damascus. The Last Chance goes into the other.

Q. The Middle Fork?

A. The Middle Fork, of the Middle Fork.

Q. On the Middle Fork side?

A. Yes. The Damascus Mine is situated on the South Fork of the North Fork of the American. It tails right into the North Fork and is above

the Gold Run mine

I what did you observe in the North Fork of the American above Canon Creek, down to Rees bridge, with respect to the deposit of material in the bed? A I noticed that where the material from the mine was falling into the river there, there was more or less deposit there which kept increasing gradually until it came down to Pickernys Bar. There there was a notable increase of the quantity of the material such as I saw in the mine at the Gold Run claim, cobble stones, and indurated gravel. We found that quite a bed of gravel; I could not ascertain its depth, except that from the bar or the sides and probed down towards Rees Bridge it differed in thickness from 4 to 2 feet, spread out there.

Mr Hart Q Do I thin out
how much?

A I thin out to a foot
or two or three

Q At Rice's bridge?

A Yes sir at Rice's bridge
as we went down on it

Mr Belcher Q Did you
observe this lower stratum
of the mine that remains
to be worked?

A I did

Q What will become of
that material if moved
from the mine?

Mr Hart I object to the
witness testifying as to
that until he is shown
to be competent

Mr Belcher He has shown
himself to have had charge
of mining operations at
Blue Tent and the
El Dorado mine for a
series of years, to be
himself a mining engineer
and expert who has been
engaged in this business

for over 20 years

Mr Start All mining engineers are not competent to testify on this subject. Some of them might be mining experts or call themselves such, and still not understand the question unless they paid particular attention to it.

The Court Have you studied and examined as to this matter? Ayes. I have made that a special study.

The Court Proceed.

A If moved from the mine, it will pass through Canon Creek and ultimately into the branch of the North fork of the American River and as the grade becomes less and less it will there settle and become consolidated and will be re-cemented in the bed of the present

river, as it has been
re-cemented in the
bed of the ancient river
formerly

Mr. B. B. B. Containing the material
for cementing again?
Ayes

What illustrations
have you of that?
State you any to give
from your own observations,
say at the El Dorado?
State you ever seen
the Polar Star?

Ayes I have seen the
Polar Star and been
across their dump
many times

O O! those mines - the
El Dorado and Polar Star
afford illustrations? If
they do state how.

A Yes. At the Polar
Star there we find coming
from the Sunny South
and other mines, a
large amount of this same
character of material.

and it has settled and formed and consolidated itself there forming a perfect dam or bar. At the El Dorado we have an illustration of the same in two Cañons; one in Stony Ravine, the other in a ravine the name of which I do not remember. And the other is, the tailings have been lodged for a number of years in Weber Creek. Right in front we have there from 15 to 20 feet in depth of gravel and it thins right out just as the grade increases a little and then settles again and thins out. You will find a succession of them for 10 or 12 miles in the bed of Weber Creek. Especially is this the case at the mouth of Weber Creek where

it empties into the lower
fork of the American
river, and especially
are there instances of
it in and around
Coloma

Q. What is the character
of the Polar Star gravel
as compared with the
Gold Run? A It is
similar in character.
The only difference is
that the rocks are larger
in place in the Polar
Star mine than they
are in the Gold Run,
but —

Winstan <ut> Larger
in place?

A Yes. But there is
no difference that I
could note in the
size of the rocks as
found in the river
for the reason that the
rocks have to be blasted
on the bed rock before
they are put into the

sluice and the grade is just about the same Mr Belcher And in their new place or place of deposit how is this bed of cement as compared with it in the original place in the old bed?

As they are just exactly the same, mixed up with the fine material of course they go in there first of all. Probably the first lot of cobble stones that will settle there will be more or less open-intersticed, and by and by the water will come right down, and the next flow of water that will come will fill it up with fine material which will ultimately form the cement, and is now rapidly cementing

What do you say of the processes by which this is formed and the

old channel or river bar was formed or the deposit in the channel.

Is there any difference in the processes by which this is formed and the old was formed.

Ans, not a particle of difference.

Q With reference to this particular mine, the Gold Run mine is it practicable to work it by any other than the hydraulic process?

A Not practicable to work it by any other process than the hydraulic so as to be able to save any considerable quantity of the gold it contains.

Q Suppose that mine were to be drifted or quarried and milled; would it produce by that process more or less material to be carried

by the water than it will be mined by the present process, the hydraulic process?

A If that were quarried out as you have suggested and crushed why then a much larger proportion of the material that would be dumped into the river would find its way more into the rivers in proportion to the size of the material itself.

Q Is this fold Run deposit or mine an isolated deposit, or forming a part of something else?
A No.

Q You say it is not isolated? What is it?

A It is without doubt a part and parcel of an ancient river system that once existed in this Country at a much higher level than the

present water courses

Q Did you notice at the mine or in the river below, from Canon Creek down to Rice's bridge the character of the sand that you found there?

A I did

Q Have you noticed it on the American river between Sacramento and Folsom?

A I have

Q What is the difference in character if there is a difference?

A That which comes from the Gold Run mines is composed of crushed quartz, crushed plumb and crushed porphyry. That which is found here between Folsom and Sacramento is composed largely of pulverized granite, a large excess of mica predominating.

Q Do you find any mica

Or any Considerable Amount
of Mica at the mine or between
Canyon Creek and Rices bridge
A No I observed no Considerable
quantity of Mica. I do not
remember that I saw any
Mica

Q How do you account for
the difference between the
sands which you find on
the American between Folsom
and Sacramento and that
which you find say betw-
een Rices bridge and Canyon
Creek }

A I account for it for the
reason that there is a large
bed of granite existing
between here and Coloma
and going up on the South
Fork, and going up on the
North Fork in the direction
of Auburn. I cannot say
just exactly where the granite
belt ends there but it goes
up pretty well, and this
granite, it is evident, pul-
verizes and decomposes and

peals right off year after year,
 and there a large number of
 people, and some class of
 working going on in this
 region continuously, digging
 up the bed rock for the
 purpose of finding the gold
 I think this thing is entirely
 different, for it is precisely
 the same physical character
 Q And that these Mining
 sands which you find here
 came from that quarter

A Largely

Q Have you examined or had
 occasion to examine on the
 head waters of the American
 River or any portion of it
 the character of the rock
 and the formation geologically
 A Yes. I have examined the
 character of the formation
 existing on both the branches
 of the South Fork of the
 American; what we call
 the Silver Fork branch and
 the Slippery Ford branch.
 10508 Q What do you say there

as to the Character of the Rock

A On the left a little above Slippery Ford branch for at least 12 or 15 miles the water flows down through a Moraine Containing large rocks and also a large quantity of pulverized material such as is always left behind by Glaciers, They are many hundreds of feet in depth on the head waters of Silver Creek; inormous ^{quantities} of Volcanic ash - Tufa Sometimes Called - 1200 or 1500 feet in height, waving, tumbling down and coming into the water courses.
Mr Hart Where is that?

A at the head waters of the Silver Creek which is the South Fork of the South Fork of the American River
Mr Belcher What do you say of this Tufa as regards its disintegration?

A It disintegrates during the winter time and is covered

largely -

Mr Hunt (interrupting) I wish you would give me the name of that Creek?

A The head waters of Silver Creek.

The Court Silver Fork

A Yes; Called Silver Fork. It is Called Alta Creek too.

The material when exposed to the action of the frost is disintegrated and falls right down, and with the heavy freshets of springs is carried into the south Fork of the American River.

Q Yes is it a light or heavy material

A A light material

Q How light would you say as compared with quartz or slate?

A Much lighter. At one time in some instances it has been a volcanic ash, in other places it is a volcanic mud, indurated volcanic mud.

Q And you say found there

in large quantities?

A Yes. Continuing right down you find considerable of a soft volcanic material on the south side of the south Fork of the American.

Q Do you find this same material on the other branches or at the head waters of the other branches of the south Fork and of the middle Fork?

A I have not been up so far into the middle fork, but on the north Fork there is considerable of this same Moraine Comes in

Q When you speak of Moraines do you use that word as being the equivalent of Pufa?

A No.

Q It is an entirely different thing?

A An entirely different thing. One, the Pufa, is the product of a volcano and the Moraine is the product of a Glacier

Q That is, it is at the

lower end?

A Yes.

Q Where it melts?

A Yes. The Ice transports this material probably enveloped in its Cold embrace and when it melts it then drops and leaves this material.

Q Do you account for the formation of these many lakes at the head waters of the American River in that way?

A Yes. Silver Lake is undoubtedly that way. Audewine Lake. Echo Lake is the same. Fallen Leaf Lake is the same. And undoubtedly Lake Tahoe is the same.

Q That is, that the Glaciers formed the head waters?

A Yes.

Q And those Lakes back of them

A Yes

Q Now you have spoken of the Granite ridge at the head waters of these streams. That

effect is produced upon the granite by frost and snow
 A It causes it to disintegrate and peel off in smaller layers and is carried away by the waters into the streams

Q When you speak of layers do you mean there that it comes off in thin plates?

A Yes. It generally comes off very much like the peeling of an Onion.

Q Are these Moraines this Tufa and the granite in the regions where there is frost and snow?

A Yes. Some of them are in a region where the snow exists at least six months in the year, sometimes longer

Q Have you had occasion to observe as to the extent of Cultivation and the denudation the of timber on the head water of those streams?

A Yes

Q State generally in regard to the extent and effect of

Cultivation on the hill sides and the denudation of timber. At my observation in that respect is confined entirely on the Placerville ridge, on the Placerville divide. I find that on the south side of the South Fork of the American River, (between the South Fork and the Cosumnes is the Ridge) the timber the valuable timber such as could be used for saw mills has been cut away, commencing at Placerville and extending up to what they call Moors Station. There have been a large number of saw mills at Moors Station just where the old Washoe Road crosses the South Fork of the American River for the first time.

What is the distance from point to point in miles

A The distance to that point from Placerville is about 30 miles, latterly they have

also established a saw mill
Called Blairs Saw Mill at
a point known as Cedar
Rock - Sugar loaf - which
is a distance of 45 miles
from Placerville.

Q These distances are up in the
mountains are they

A Right up in the mountains!
Right into the mountains within
about 30 miles of the Sierra
Nevada

Q You have given there the
extent in length?

A Yes.

Q What is the effect

A The effect has been that
a large amount of surface has
been uncovered and exposed
to heavy falls of snow coming on,
disintegrating and falling down
into the stream. Is very
precipitous right there at
Sportsmans Hall. Commencing
at that point, down to the
South Fork of the American
River is a fall of 1500 feet,
from the summit of the

ridge or Spertmans Hall
 down to the American River,
 only a distance of about
 three miles, there is a fall
 of over 1500 feet. For the
 first mile or so it is pretty
 level; then it commences to
 be very steep. In the early
 days the old South Fork
 Canal was constructed right
 down a few feet above, com-
 mencing above the River, and
 the whole of this side hill for
 24 miles has been denuded
 of timber to supply 24 miles
 of fluming that was constructed
 there in '52 when they con-
 structed the ditch. It was
 kept in continual repair
 year after year, some years
 using as much as a 1000
 feet of lumber for repairs;
 so that, from 1852 up to
 1875 when the new Company
 that is connected with
 took it, this country was
 travelled immensely by people
 cutting the timber down and

producing a great amount of degradation.

Q What is the increased amount, if any of degradation due to the inhabitation of men and Cultivation of the soil?

A It increases it fully ten fold. the difference between a Country not inhabited and one that is the degradation is ten times the amount in the former.

Q Are scientific men agreed as to these figures

Mr Hart We object to that as leading

Mr Belcher It is leading, but we want to ask the witness if this were something that was adopted by scientific men generally.

Mr Hart I suppose he is speaking of what he reads at this time. I do not suppose he has made any actual experiments.

Mr Belcher Have you had occasion in your connection

With Schools and in practice
to do with Agriculture Chemists
Or Analysis of Soil and Manures
A I have I have had considerable
to do with.

Q Practically?

A Yes.

Q Nor theoretically?

A Practically; I have had
the Analysis of soils and
the Analysis of manures of
all kinds to make, dating
from 1859. From 1859 till I
Came to this Country I did
considerable of it.

Q What is the Composition,
or what elements compose
for the most part the aur-
iferous gravel deposit?

A The Auriferous gravel deposits
are composed thus; probably
they will average about 60
per cent Silica, probably
about 10 or 12 per cent Alumina
two to four per cent Iron,
probably one per cent to two
per cent pot-ash, one to two
per cent soda, a little

Sulphuric acid, traces of phosphoric acid and some, a very small quantity of Organic Matter.

Q How will this material compare with the composition of soils?

A It will compare favorably with the composition of soils, so far as the elements are concerned, with the exception of having a smaller quantity of organic matter.

Q Something has been said here of slickens. What do you understand the word to mean? What is it? What is its composition?

A I understand slickens to be the material which is reduced to an impalpable powder produced by the grinding or the disintegration of the rocks. A sample of this material was sent me by Judge Wallace for analysis. It was marked, "Slickens sent me by Judge Wallace in a small box

marked "Slickens from Cat
 pitir number five A.S.G."
 Case of People vs Gold Run
 Ditch and Mining Company,
 Case number 498. I found
 that to be composed of the
 following =

Silica	59.88
Peroxide of Iron	5.74
Alumina	25.20
Lime	.87
Magnesia	.77
Potassa	1.44
Soda	4.96
Chlorine	.06
Sulphur	.24
Phosphoric Acid	traces
Water	.51
Organic Matter and Loss	.93
Making up the	100.

Mr R. Loades That is the
 water? .51

A .51. I should explain
 here that in as much as it
 was impossible to keep slickens
 in a normal condition as
 regards moisture I dried it at

the boiling temperature of water
That is the only way by which
I could get a uniform results,
if they should want to be
checked at any time. It is
the universal way of proceeding
of all analytical Chemists
Mr Hart Will you let me
look at that from which
you read

Mr Belcher Shall we need to go into any further inquiry that that was a sample that was sent down there for examination

Mr Harr I suppose it is the same. Judge Wallace says so and I suppose it is the one that was sent down

Mr Belcher How much per Cent of Silica did you find or have you found in the soil, in the most productive soil?

A I have an analysis here of what is called loamy soil which is as follows:

Silica	63.14	Sesque Oxide	Iron
4.87	Alumina	14.	Lime .83
Magnesia	1.02	Potash	2.86
Soda	1.43	Sulphur	.09
Phosphoric Acid	.24	Carbonic Acid	.05
Chlorine	.01	Organic Matter	8.55
Water	2.70		-

The only difference I find here is in the quantity of Phosphoric acid. In the slickens that I analyzed I found

Phosphoric Acid present in too small a quantity to be estimated. Here it is found in this loamy soil a quarter of one per cent and Organic Matter 8. with that exception they are almost identical

Q Have you frequently found phosphorus in appreciable quantities in the same class of material in the slickens
A Yes

Q How is it generally so far as you have examined it
A It generally contains from traces up to about a quarter of a per cent, the same as this loamy soil. I wish to explain that a large quantity of these slickens so called may be nothing else but the pulverization of the soil itself with water. If you take loamy soil and put it in water, when it settles it will then be slickens. There is no difference between it

So far as any physical appearances are concerned because the organic matter will have been washed away and nothing will be left but the mineral portion.

Q What do you say about the effect of slickens so called on soils?

A Its effects on soils will be undoubtedly to fertilize them.

Q What is required in a soil for the production of Cereals. Wheat, Rye

A You want to have there Silica and potash and Soda and phosphorus.

Those are the mineral constituents that Cereals require

Q Is silica a necessary constituent of the soil for the production of Cereals?

A yes. As an illustration of it I could give an analysis of the ashes of wheat say or straw, That is one way to get at it.

Q Very well give it to us so as to illustrate it.?

Mr Hart What are you reading from now.?

A I am reading from my own notes, I cannot retain these percentages in my head
Q When were these notes written

A They have been written for the last few weeks

Q For the purposes of this Case

A Yes for the purposes of this Case

Mr Hart I object to them going into the books to find out these things

Mr Belcher That is from your own work

A My own work my own experience, Not books. I have it in my note Book here and I can say generally that the essential Constituents of wheat are Phosphoric acid potash Soda Lime Magnesia Chlorine & Sulphuric acid

And Silica, The necessary Constituents of straw - it requires a larger percentage of silica and the same ingredients that the Kernel of the wheat its self does

Q You first gave the ingredients of the Kernel its self?

A Yes. Non silicious soil would not grow anything. The predominant element of the soil is silica. It is necessary to have from 60 to 94 per Cent. Some of the best producing soils I have been acquainted with in England contain 94 per Cent of silica.

Q And how is it for the production of Potatoes and grass?

A It requires just about the same ingredients but they require more potash.

At the time of the investigation of the diseases of Potatoes in England it was supposed that it resulted entirely from

the fact that the potatoes had taken up all the potash in the soil. A soil destitute of potash produces diseased potatoes

Q Have you had occasion to notice and have you noticed the Cultivation of lands produced by sediment A I have sir.

Q Where?

A In Eldorado County in the immediate Neighborhood of Placerville

Q And Elsewhere

A And in Yuba County I state what you have seen in that regard in Eldorado County?

A Upon one of the branches of Hungtown Creek Called I believe Prospect Flat Ravine there has been for a number of years a ten Stamp Mill, now so as work Crushing gravel that is very similar in many respects to this but which

Centains probably a little more quartz than this. They have been crushing it there and a man named Lyon has intercepted the whole of the material as it was discharged from the sluice of the mill, right on the bare rock and upon that he has got fruit trees of all kinds and pumpkins and tomatoes, I think they are not excelled, at least they were not excelled by those that were brought to the Elavado County Fair and all of his products were entirely raised on this slickens or material made by the pulverization of the gravel. Following a little further down there is an old man named Lewis who has made quite a number of acres perhaps ten or 15 all told and for a number of years he has been cultivating it

with Clover and Alfalfa raising from 3 to 5 tons to the acre each year - three crops. of course he uses water to irrigate it and this material rests on the naked bed rock.

{ Any other }

A Yes Continuing further down into what we call the upper Town there are probably 15 or 20 acres of land that has been filled in from material that came from the washings of the Spanish Hill mine.

and upon it there are fruit trees of all kinds growing. Continuing down now to the town itself John Blair has a claim on Langtown Creek and he has some three or four acres of land that has been made entirely from the debris from the Creek and that is being cultivated

and he raises from three to five tons of Clover to the acre and you will find the same thing still lower down the Creek

Q - Now you have spoken also of Yuba County

A - In Yuba County it is what I have seen in the neighborhood of Smartsville

Q - Is there successful cultivation there A - There is successful cultivation there around Smartsville. And they use the water from the mines the muddy water from the mines -

Q - Use it for what purpose

A - For the purpose of irrigation. And the water of the Eldorado water company generally is taken up as second and third water and it is used for irrigating at Placerville Coloma and Gold Hill in one direction and up on Missouri Flat in the other

Q— You have spoken of your connection or your studies in the matter of agricultural chemistry and geology. Have you had anything to do with matter pertaining more directly to the history of diseases — poisons particularly A— Yes. During the time that I was a professor of Chemistry at the Toland Medical College and the Medical College of the Pacific my Chemical Chair called upon me to treat upon those subjects.

Q— Have you ever given attention to the subject of malaria and the cause of malarious diseases A— I have Sir.

Q— What do you say in regard to the sedimentary matter brought from the mines in regard to their producing malaria or containing the seeds of malarial diseases, the germ A— They have no connection whatever

with the production of disease in and of themselves -

Q - Does malarial depend upon the mineral or some other portion of the soil?

A - It depends entirely upon the vegetable growth that is produced upon the soil. Where rank vegetation grows and the land is first cut and opened there Malaria exists universally -

Q - What is the rule in regard to Malaria then in the opening up in a new country to cultivation?

A - If the land is rich there is always Malaria -

Q - And by what class of disease or diseases is the Malaria followed as the country becomes older?

A - As it becomes older and becomes inhabited it is followed by what are generally known as filth diseases a more

malignant type of Malaria such as Typhoid etc.

Q— You include Typhoid fever as one of the filthy diseases

A— Yes.

Q— What others do you include in the same connection

A— Diphtheria, Scarletina, Cholera and yellow fever.

Q— Those are what are sometimes called Zymotic diseases. A— Yes, connected with poisonous gaseous emanations.

Q— Have you examined the drainage and sewer system of this City A. Yes. I have given several days to the investigation of that matter.

Q— State what you found or the result of your examination A— I found that they have a system or rather an attempt at a system of sewerage.

Q— Would it not be better to call it the want of a system.

Mr. Hart - I object to ~~that~~ it is suggestive - A - I found first that they have a sewer on Thirteenth Street which runs down to R. The next Sewer is on Ninth Street and the next on Seventh then Fifth and Third and First - All continuing in their course until they intercept R Street where there is a main Sewer from R to Y. About half the distance however at that point this Sewer from R to Y is not covered, it is an open Sewer. I found that the houses are connected with these main sewers, the sewers on Thirteenth Ninth Seventh Fifth Third and First with small sewers made almost invariably of wood - occasionally they have -

Q {Intg} That is by lateral sewers A - Yes - These lateral sewers when made of brick, those that I could see were loose and were

not cemented together - Then continuing down beyond Y Street for one hundred feet or so it discharges into an open sewer on a very low grade as I would judge from the velocity with which the water was going - It then empties -

Q - (Intg) Let me ask you in that connection if you heard the testimony of Bassett and Knox with reference to those sewers A - Yes -

Q - Then the statements which they made you may consider

A - Yes - What I am saying is based upon what I have heard from Mr. Knox and Mr. Bassett - And from there down for a distance of about seven thousand feet, I did not measure it -

Mr. Hart (Intg) I object to the witness stating what he heard Knox and Bassett state here - A - I am basing only as to a description in detail of the sewers - That

I base on their testimony - I found that on some of these streets there was a system of sewers emptying into the main sewer on R Street. There was a main sewer then running from R Street to Y Street. I went down from Y Street and followed down and some of the distance it was an open sewer. I went down to what is called Grundens Lake where the sewer seemed to have terminated. Then I found there was an opening there and I was informed that that was the sewer. I continued down for a distance of some four miles - probably six miles, four to six miles, until I found that the sewer terminated at a place called Beech's Lake. That I found to be a series of lakes in marshy low tule land. With a view of finding how efficient this drainage as it is called

was I ascertained a little above Freeport at the Bridge the velocity at which the Stream was going and I found that it travelled at the rate of five feet a minute That was the velocity -

Q - Five feet a minute

A - Yes. Fifteen feet in three minutes and twenty seconds was the exact time.

Q - Did you determine at all as to the extent of the natural drainage from the East? A - I did Sir -


Q - Coming into this city?

A - Yes I did Sir.

Q - What do you say of that? A - I noticed

that as we went out right to the East, that is to the East here - I went out as far one day as the head of Burns Slough on thirty Irish or somewhere out in that direction - There I found that they had sunk three different wells, Springs.

They had bored them down one
Sixty one Seventy and one
Two Hundred feet — Artesian
Wells bored there and they discharged
a large Number of Gallons of
water. In making this trip
down to Beech's Lake and
from my previous Knowledge
of the Country Generally I
found that up to the East here
for quite a distance the
drainage must fall into this
basin in which this Grandon
Lake and Beech's Lake as
well as some other Lakes
were situated. It must have
been at least Six
miles of drainage
here from the bank
of the River —



~~2. Where it is less?~~

~~1. Where it is less~~ ^{The artesian wells I speak of are} flowing in the aggregate a large number of gallons of water; I have got my notes here. They will tell me the exact number - in making this trip out to Beachy's Lake and from the previous knowledge of this country travelling so often, I found that there was, up to the east here, quite a distance where the drainage must have filled in this basin in which this Inundon and Beachy Lake as well as some other lakes were situated. It must have been at least six miles of drainage there from the bank of the river, that being the river the bank sloping down here (illustrating to the Court) and extending back for five miles for a distance I went out there - to Beachy's Lake, as distance say of seven miles by five miles back, which must inevitably

from this branch; ~~that~~ all of this water for 35 square miles receives the drainage in ~~that~~ low-land, through which the attempt is being made to drain sewers of Sacramento.

2. Did you examine so as to determine whether, or not the water-closets and cesspools of the city were ~~is~~ connected with these sewers?

A. Yes sir. I examined them at several points and found that the privies and the water-closets were not connected with the sewers except so far as when there was an overflow and in a large majority of cases of my examination they did not even connect with an overflow. — that an overflow did not connect with any sewer.

2. State us to the quantity of fecal matter per thousand inhabitants per year.

A. 25 tons.

2. 25 tons to the year?

A. Yes sir, each thousand inhabitants will deposit 25 tons of fecal matter in a year.

Q. And what do you say for the amount of urine discharged also in the soil per thousand inhabitants?

A. One thousand inhabitants will deposit in the year 91,250 gallons urine.

Q. What effect will this discharge of urine in the soil in the course of 15 or 20 years produce upon the health?

A. It will have a tendency to produce all the diseases that I have already designated as filth diseases.

Q. Are these filth diseases dependent upon what is denominated filth generally or of the filth of human production?

A. They depend entirely on the filth of human production generally.

Q. And depending very largely

upon the two things we have
name, excrementaceously?

A, Yes sir always leads to
diseases.

Q, Why is it that the urinal
deposit is worse than the ex-
cretion, the solid?

A, It will enter in a more
complete state of decomposition
and much more rapidly
and penetrates more into the
soil.

Q, What is the effect upon
the soil of having open
sewers — sewers I mean
now that are loose at the
bottom and on the sides?

A, The effect is that the
urine material percolates
and penetrates right in the
soil in every direction and
when ~~an~~ the hot sun in the
spring should come forth, it
seems then to generate dis-
eases as any warm weather.

Q, What is the effect upon
a soil that contains this
material or poisonous matter

of water?

A, It is the same as it is upon the air, it poisons water, it carries into it what are called the albumenoids, ammonia and the nitrites and the nitrates which are the precursors of filth diseases.

Q What do you say of the use of wells for water for drinking purposes or for use in any city that has been inhabited for any considerable time. A They have very evil effects - have always followed it

Q And that whether they have a good or bad system of sewerage? A Yes Sir

Q What is the effect of dry summers or dry seasons as compared with wet winters?

A You mean in this place?

Q Yes Sir,

A The tendency would be as long as the ground or soil water is high, the poisoned earth, the material is kept very moist and wet, and does not seem to spread the disease and in proportion as the soil water will sink lower then disease will intensify, so much so that it is a rule that physicians have set up in those countries that are subject to these diseases, that

the disease is aggravated in proportion as the soil water sinks

Q That is general?

A That is general; that is the universal accepted doctrine

Q What effect upon soil water will be produced by the building of shafts at right angles to each other at short distances?

A The tendency will be to form artificial underground reservoirs and so retain the water and raise the soil water.

Q What is the effect of trees and cultivation of that character.

A When trees are closely planted together they spread from root to root and form a perfect embankment, and so reservoir the water underground

Q What is the rule in regard to soil water or water in the soil in land that is covered with timber, as compared with that which is not?

A It is nearer the surface in land covered with timber than that which is free of timber

Q You have said that after a dry season the character of the disease would be somewhat or considerably aggravated, why?

A Because the soil water would be lower

Q Notwithstanding the fact that the soil water is lower and that the poison had permeated through the soil, why should disease follow then more than when the soil is full of water?

A It permits the air to circulate right through the soil that is already laden with this material, accelerates decomposition and sends the foul emanations into the air

Q What proportion of air will soil contain or dust contain?

A Soil varies in the

quantity of air held in the interstices - the porous soil will vary from 25 to as high in some instances as even 75 per cent

And circulating
Oxygen in

Now I want to ask you what you found; you said you examined some of the privies here I want to know what condition you found them in

At the first privy I examined, if you will permit me to look at my notes I will give them in order. I first examined one on Rand L between 8th and 9th - 811 S. Street. This privy is $6\frac{1}{2}$ feet in depth below the grade of the yard and is perfectly dry, no indication of soil water. The excavation

is not bricked but is
 entirely in earth. And
 then a little distance
 from there I found there
 was a lot with small
 tenement houses on it,
 corner of 8th and L.
 That lot is 160 feet on
 8th Street and 80 on
 L Street. There were 8
 small tenement build-
 ings there and two large
 ones. In the rear
 there were privies, one
 with a depth of some-
 where about 6 feet I
 would judge, I estimated
 by probing something down
 and found that this one
 was filled with water
 or very nearly within
 probably 18 inches or 2
 feet but this is accounted
 for; I noticed that there
 was a hydrant with
 water running into it
 immediately on the other
 side of the fence

There was another privy that was down about 6 feet and was only just moist. About 80 feet still further there was another one to the depth of about $6\frac{1}{2}$ feet that was dry.

What did you find in these privies with respect to filling up with fecal matter?

As well it was all fecal matter to be seen at the bottom, I saw no moisture.

As to the depth of that you do not know. No water there. I went to 714

S. Street between 7th and 8th and there we found a privy just simply full of fecal matter. The next place I went was No. 706. This was full to within nearly 4 feet. It was dry

Olwell I do not care about the details of the houses, but simply the general result?

As with the exception of that one that I was in there was only one contained water and that the water came in from a hydrant since the adjoining ones were dry all around there

Q And most of them well filled?

A Yes sir. And I went to another one within about 300 feet of the levee that was about 12 feet deep, right on the old ground they told me, I could see that we went down into a hole there that was No. 115 & Shees 12 feet deep and dry, no water

Mr Belcher You have

stated that these closets are not connected with the sewerage system?

Answer, excepting that there was an arrangement in some of them when an overflow came, and they were connected only with cess-pits and when they overflowed they overflowed to a cesspit, so that the whole country was permeated with this material.

Q What is your judgment of the character of this sewerage system in this City?

A It cannot be regarded in any other light than a very poor apology for one. The grade is for seven miles only some seven feet and that is fully corroborated

by the velocity with which the drainage canal carried floats of woods placed on it. It is a well recognized fact that no sewer system is complete unless there is a fall of at least 2 feet to the mile; this however will depend largely upon the character of the material that will flow in from the streets if it is permitted to flow in from the streets - Judging from the coarseness of the material that is lying on the streets here in Sacramento during the last few years, I would say that nothing less than $2\frac{1}{2}$ feet would be at all sufficient to carry away the road material that goes into the

sewers here. Then in order that a sewage system shall be complete and perfect, it is necessary that there should be three conditions fulfilled: 1st. The surface water should be carried away and not into the sewers at all: 2nd Some provision should be made to drain off the soil water; and 3rd The sewer itself should be perfectly tight with a regular volume of water flowing through it so as to be able to flush it.

When you say the sewers should be tight you mean by that that they should be so constructed that water would not pass out from them or into them? Certainly,

as long as the sewer conveying poisonous material right through the centre of a sheet or through a Country all open and porous permitting the poisonous material to spread in every direction you might as well have no sewer at all

Q In order that the sewerage system should be effective, the fecal matter should be carried directly into them?

Yes Sir

Q And what do you say in regard to the closets themselves, how should they be made?

A They should be so arranged that they should have a direct connection with the sewer

Q Should they be made by simply cutting a hole in the earth?

Ans sir

Q What should it be?

At they should receive it through pipes to carry it away immediately and be on a larger grade than the main sewer

Q Suppose that that was not convenient to be done how then should they be made in order to prevent the poisoning of the soil?

A They should then be received into a cess pit of material which has been made of hydraulic cement water tight and so arranged that the least possible amount of exposure of the surface is to occur in any way to the mass, but that is one of the first principles that they should be made out of the best hydraulic

cement, so that no water
can come in from
the outside, neither can
any of the liquid from
the inside percolate
to the outside.

Nowhere there is not
sufficient fall or
natural grade to the
land to give 2 feet to
the mile how is that
trouble to be overcome?

A Boy pumping it up,
laying out your sewers
in such a way and
to such points that
you have got your grade
of two feet and at that
point establish a large
cesspit, and from that
point pump it.

Have you examined
the report presented by
the State Board of
Health in regard to
the sewage of London?

A I have Sir

Does that present

anything of that kind.
 Ayes Sir. The whole
 matter is fully set
 forth there.

Q And what does that
 present in respect to
 this very matter you
 are now speaking of,
 of overcoming that?

Mr Star I object to that
 as irrelevant and immate-
 rial.

A That, when you
 have not got the grade
 you have got to pump
 it so as to get the
 grade.

Mr Belcher We can
 offer the report itself.
 It is a report presented
 by the State Board of
 Health here. The report
 is one from a San
 Francisco physician
 who was then in London
 and made his report.

Q What is the character
 of London with respect

to being level or hilly?

A It is hilly, very well arranged for the best kind of gravitation sewers, but still of course there are flats there and places where it does not permit them to get a full of 2 feet

Q And where it does not there? A Then they have to pump

Q Where the authorities have to pump it?

A Yes sir pump it up to a sewer at a higher grade so as to get the necessary fall

Q Do you know anything of the sewage system of Boston?

A I only know that they are now about arranging that to pump their sewers in order to make a more effective way of disposing of this material

Q In connection with this matter which you have spoken of of filthy diseases being due to the decomposition of animal matter what is it - what particular element of animal decomposition?

As well as nitrogenous matter, that has been found to be the material that contains the germ of the disease so called

Q Nitrogen in some of its forms? Ayes sir it has been proved to be nitrogenous in its character.

Q Is nitrogen produced from vegetable decomposition as well as animal?

A A few, such as the Cabbage and the reddish and the lettuce a little.

Q Now something has been said in the course

of the examination in this case in regard to the water level here being considerably higher than it was in earlier days say prior to 1860. Assuming as a fact that it is considerably higher at this time than then, to what would you attribute it or have you given examination to the subject so as to be able to form an opinion — the higher elevation of the surface water in the land here, I mean soil water?

Ayes Sir I have looked into the matter very carefully for sometime.

Very well, state the results of your examination.

As the result of my examination as to what controls the soil water is that the lowering of the water in the soil is due

principally to the follow-
 ing physical condition
 of things at Sacramento
 there I have an ideal
 view <diagram> of what
 may be termed the
 Sacramento river and
 here is the bank <indicating>
 This is the high grade to
 which the City has
 been raised from the
 old surface and back
 here the basin that existed
 here at one time has
 been filled in by these
 levees, filled in by
 the cross sheets, filled
 in by embankments,
 filled in by digging
 down to get foundation
 for houses, filled in so
 as to get in some places
 these cess pits, thus
 displacing the water out
 of the basin that once
 existed here and receiving
 the drainage back towards
 the foot hills in this

direction to the East say
 for five miles in width
 & as far as I have been
 down here to Beech's Lake
 17 miles in length
 making $7 \times 5 = 35$ miles
 that water cannot
 possibly have any other
 outlet than into these
 various points, these
 sewers, this chain of
 lakes as well as into
 this point here, <referring>
 since it could at no
 time escape into the
 American; at no time
 could it escape down
 here to the Sacramento;
 this has been the natural
 drainage of this slope
 of country existing here
 between the American
 on the North, the Sacra-
 mento on the West and
 the Mokelumne river to
 the South; then the
 drainage came right to
 the basin and this

obstructed and circum-
 scribed by the levees
 holding the drainage
 that come in this direction,
 and when the drainage
 coming right down here
 in the Spring, which is
 always the time of the
 water coming down,
 the percolation in any
 of the Summer months
 necessary to fill that
 in virtue of the rapid
 evaporation that goes on,
 it has no connection
 whatever in my opinion
 with the rise and fall
 of the Sacramento river
 per se; of course under
 like conditions and
 like circumstances
 the rivers falls, and
 why? because there
 is no water behind
 it or not as much as
 before. The soil water
 falls in your basin
 why? because it

has ceased to receive the drainage to the same extent as it did formerly from the East and consequently evaporation goes on rapidly through the soil, and these lakes down here which have been full in the winter, scarcely permitting of any grade at all to drain the water, they also evaporate and the evaporation from a given surface in any country is always larger than its rain fall.

Q What effect upon the soil water would the pumping in and using ^{of water} for purposes of irrigation and for the convenience of families living in the City have?

A It would of course materially increase

the water that would have to be drained out in this direction and consequently raise the soil water.

Do you know what effect has been produced in the large tracts that have been irrigated about Tulare Lake and in the Mussel Slough Country or elsewhere upon lands which were dry - irrigation for several years?

Yes sir the effect is that every year they require less and less water to irrigate them, for the reason that they raise the soil water.

As they raise the water nearer to the surface?

Yes sir that is especially the case if there is no possibility of a place for it to drain

drain away

Q One question: when you were speaking of the mountains I neglected to ask you the effect of sheep particularly in the mountains and hilly districts?

As well the effect is much more than people are generally willing to consider. If they travel over a country after a band of 5000 or 10000 sheep has gone over it the effect is self evident and to such an extent is this known in Europe I think it is in Prussia that it is prohibited that sheep shall so any longer to graze in the mountains and latterly probably one of the closest observers of the changes of Nature, Mr Darwin, says that

worms have more to do with the disintegration and pulverization of the soil than anything else - not one worm but the countless billions and millions of them have a tendency to change the surface of the earth.

Q By the Court That is where it is washed?

Ayes Sir

Mr Belcher Q In connection with sheep also I want to ask you whether they do more than cut the soil with their sharp feet?

Ayes Sir of course they destroy the young vegetation that sprouts up, little trees and so forth.

Q They take every green thing away? Ayes Sir.

Q And is that the reason for their prohibition?

And sir they have been found by disintegrating and breaking down the soil to cause muddiness of the streams and to interfere with some Prince's fish preserves in the river, driving the fish away and causing the river to become muddy

Cross Examination of Thomas Price

Mr Start O now long have you been investigating the question of sewage water in this Valley?

Mr Beleher I did not use the word "sewage water" at all.

Mr Start I do
The witness I will have first of all to ask you to give me an explanation of what sewage is since

I have been trying to find out what it means but there is no dictionary or encyclopaedia or any thing accessible to me that gives me any definition of that word, so that in order to answer the question you will please explain to me what you mean by seepage.

Q Do you swear that it is not in Webster's dictionary?
A I could not find it

Q Have you looked at it?
A I have

Q Don't you know what seepage water means as used in this case numerous times?

A That is what I want to get an explanation of

Q I ask you the question whether or not you know the meaning of the word "seepage water" as I use

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it and as it has been repeatedly used in this case?

Mr Belcher I object to that. It has not been used to this witness, and if he uses the word now to this witness he must explain what he means. If the witness desires him to explain it.

Mr Hart Q Do you mean to swear that the word "Ripage" is not used in Webster's dictionary and in all standard works written or compiled by lexicographers?

A I have looked for it and failed to find it.

Q Do you say you do not know what it means as used by me?

A No I do not really. I must say, I have not been able to get it and the only understanding

I have had of it is this,
and I will give it to you,
the percolation water
through the banks of the
levees of the Sacramento
into this Valley?

Q Well that is a very
good definition

A If that is your def-
inition then I am very
well able to answer it

<The question is repeated>

A I have investigated
it closely since the
commencement of this trial
and before

Q When did you in-
vestigate it before the
commencement of this
trial? A I have

had a great deal to
do with the studying
of rivers in my general
reading and in my
studies and I know
what phenomena are
connected with torrents
and with the overflowing

of waters, rivers and so forth so that I have a general knowledge of this subject before the commencement of this trial.

Q When did you first commence the study of the sewage water in the Sacramento Valley?

Mr Belcher I object to that as not cross examination.
The Court <after discussion> with the understanding that you mean the same by sewage water that they do by soil water go on.

<The question is repeated>
Mr Belcher I object to that as not cross examination; he has not been examined about the Valley.

Mr Hart Well in Sacramento City?

A Since the commencement of this trial.

Q You never examined

that question before.

And for this City

Q Now say you have made a general investigation of the question as to the percolation of water through the soil along navigable streams or along streams of water?

A Yes sir

Q Do you mean to testify that water does not percolate through the soil and from what is usually called seepage water? A Of course it must percolate through the soil, otherwise there would not be such a thing as soil water. It must percolate

Q It percolates through the soil from the river.

A Not necessarily

Q Well I say it always does to some extent percolate through the soil from the rivers

does it not?

A It may to a limited extent at times but it is not the rule

Q May it not to a very great extent?

Ans Sir I do not think it would

Q Is it not a fact that soil water ordinarily in the valleys where the soil is of a porous nature does, both in winter and in summer rise and fall with the water in the rivers running along near that soil?

Certainly like causes will produce like consequences, for the reason that they are affected by the same cause, namely, the rain fall

Q You stated awhile ago that the rise of soil water in this City was due principally to what causes?

A To the drainage to the East

Q Show the drainage to the East?

A The rain fall that falls for a width here of five miles drains in that direction

Q Drains into the City?

A Drains into the City, into the regular drainage of this shed

Q Will it always do that same thing

A It must have done it always

Q Why then is the water in the soil higher now than it was formerly, the drainage being the same?

A If it be so, which I do not know, it is due entirely to the increased levels, cross streets, the building of roads, the filling in that has been done here,

the circumscribing the
area of the basin that
hitherto held the water

Q Stone they circumscribed the basin?

A To a considerable extent

Q Where? As the ruine coming on the river here, the sheets -

Q I will ask you -

A Unt? Let me answer the question first

The Court Answer the question

A In view that first of all there is a large filling going on ever since I have been acquainted with this Country which dates from 1862 where the railroad is now, a great filling has been going on there. I have noticed that the levees have been built, I have passed through here

and seen them filling up; I see that the sheets have been raised here ten or fifteen feet higher. I notice that the foundations of buildings have been filled, I cannot say the extent that that was, but I can say that it has very materially filled up the basin occupied by the present Sacramento with material that otherwise would have been occupied by water and that that will to a very great extent account for the rise of soil water.

Q Now I want to know from you whether or not destroying the basin that originally held the water which did percolate through the soil, and did go beneath the soil, and did remain beneath the

soil, destroying that basin and keeping water from standing upon the soil has the effect to raise the soil water?

A It certainly does if it is displaced

Q How does it do that?

A If you fill a basin with water and throw in a basin full of marbles the only water remaining there is the water between the marbles

Q You are speaking now of the surface water upon which they have thrown this stuff are you?

A No sir this material, these embankments don't remain where they are, they go down solid and they wash down and they fill up

Q Let me see if I understand you; I understand you now to say

that if here is a basin in that form into which water runs, that basin holding the water during the wet season: after the water has run out from the surface, leaving the soil water within two feet of the top, that, if you fill that basin so as to give it that shape and shut off the water, that the soil water down beneath will be higher than it was when it was a basin that caught the water and held it and allowed it to percolate into the soil from the basin?

A That is a self evident proposition. Two things cannot occupy the same space at the same time.

Q Is it a self evident proposition that what you put on the ground

occupies the place of water underneath the ground? Ayes sir

Q It is a self evident proposition that dirt placed on top of the ground occupies the same space as the water beneath the ground formerly occupied?

Ayes sir You got a basin ^{of water} and put dirt on it and you will find the water will run over; take a nine inch basin and put six inches of soil in it would it not raise it 3 inches in proportion

Q Now supposing you take that basin and fill it nearly full of dirt? Ayes sir

Q You put one inch of water in the bottom of that basin Ayes sir

Q Or you let it stand until it receives water

that will fill it one
 inch in the bottom
 ayes sir

Q Supposing now that
 you take the small pro-
 portion that has not
 been filled - supposing
 you fill it with dirt
 until you form a mound
 which will shut the
 water off, do you mean
 to say that the dirt
 that you put in the
 basin last occupies
 the same space that
 the water under the
 dirt had formerly occupied

A I do not understand
 you at all

Q Now suppose the
 soil water -

A ~~cut?~~ Now Mr. Sturt
 just let us understand
 each other at the
 outset; I propose to
 tell you the truth;
 I propose to explain
 every thing to you and

I cannot see why you
should start out
with such a
bombast at me at
the outset

Next I don't want any
of that kind of lecture
from you. You are a
very learned man
and wife I bow to your
learning. I don't want
any of your lectures

The Witness I do not
understand your questioning,
just put it little by
little and then I
can understand it
I want to answer it

2. That is just exactly what I wanted to do and your counsel would not permit. I wanted to put it little by little. Now I ask you whether or not, by soil water you mean surface water?

a. Not always

9. Now I ask you to explain to the Court how it is, that dirt placed on the top of the ground occupies the space that soil water beneath the ground formerly occupied?

a. If you place weights upon material that is already containing water you compress that material and force the water. You can not possibly put a load of dirt on the top of anything without exerting pressure and it will force it elsewhere; it is bound to do it. But then I will go farther upon what I have heard here. In the testimony of Mr. Knox he describes the filling in of

Sloughs with material, sloughs that ran all through here. There were levees came through here and they were filled up, that filled the basin and displaced the water.

Q Did not those sloughs carrying that water, increase the percolation into the soil and therefore increase the soil water? A Why certainly.

If you filled them up it would cause a rise of soil water

Q Do not those sloughs containing water, increase the soil water? A Not necessarily; not necessarily. There is an Evident Misunderstanding

Q Why does it not, if the water in the sloughs passing along, did percolate through the ground? A Well, those are, in a manner, to speak, like rivers and they have formed for themselves a clay bed which becomes impervious to water in many places. That is a well known fact in Holland

where they are ~~diking~~ and keeping out water several feet above the surface of the water, by taking this same kind of material called cheken, if you like to call it so, precisely the same in its character, containing about 25 per cent Alumina, and those embankments where the water is now up at its highest carry it without any percolation or seepage.

Mr Belcher You state above the water. You mean above the land?

A Above the land

Mr Hart Did you ever see a creek, slough or river in the Sacramento Valley whose natural soil was not subject to percolation of water, was not porous enough to receive water.

A It will receive some. If it would percolate all there would be no slough there. It was the very fact that it did not percolate, that made
10585 a slough possible

Q Now do you not know that the soil of the Sacramento Valley is very porous?

A Certainly it is, in places.

Q Pretty porous?

A In places

Q Now I want to ask you, if the filling up of those sloughs, the stoppage of this water which ran through the sloughs, the prevention of overflows in this City to a very great extent, or leveeing of the City so as to prevent it being apart of the drain, of this immense country which you speak of, if all of those things, taken in connection with the fact that the sloughs are filled up which formerly held water, does not prevent the percolation of a great proportion of the water which formerly went into the soil, and therefore does not decrease and tend to diminish the amount of soil water in the City?

A. No. Since you have first of all got in this City of Sacramento some two square miles and formerly the water drainage of this City was carried away through these sloughs. You have filled them up; there is no way for it to go; you have increased the soil water.

Q. It now increases the soil water? A. Certainly.

Q. How? A. Because you have cut off the avenues of escape.

Q. But we have cut the water itself off have we not? A. No. Not until lately. Rumo Slough -

Q. Intj? Have not we cut off the water that formerly ran over the surface of this City, or at least 99/100 of it?

A. I can only say that during these heavy rains, I saw here, I did not see any water percolating. There

was some going into the sewers
 but that was in a very
 heavy rain. You will find
 that, except on a very rainy
 day you can not see a drop
 running into the sewers. You
 must have seen the same your-
 self. Where did it go? It must
 have percolated into the soil.
 Where did it go formerly?
 Formerly there were grass
 plats and ground with veg-
 etation growing on it, and
 it sought the drainage of
 those ditches which you have
 now filled

2 What water sought its
 drainage there? A Rainwater
 One inch of water on an
 acre of ground amounts to
 about 25000 gallons

2 You speak of grassy plats
 What is the difference between
 the power I will say of
 grassy plats in the reception
 of water, that is the ab-
 sorption of water, and the
 power of the streets with

the cobble stones cemented together as you find them at San Francisco and in San Francisco.

A The absorption of the soil is much less. The absorption of grassy plots is about 10% of the rain fall.

Q How is it on T Street, for instance? A. On T St. it is absorbed altogether, except in very heavy freshets.

Q When have you noticed it? A. Last winter I noticed it.

Q Have there been any heavy freshets this winter?

A I won't say heavy freshets but simply rains. Every one who walks the streets of Sacramento must see that the water does not seek the sewers.

Q Now then if the sewage water is not due to the percolation, or at least if the soil water is not due to

surface and percolation from the river, how do you explain the rise of soil water, when no water has escaped from the river, and when there has been no water in the City except a very slight amount of rain?

A I will account for it in precisely the same way that I did in my ~~other~~ examination.

If you would find that water right in the top of the ground comes from?

A Let me finish please. There is back here, I said, about 5 miles that I would be nearer the truth if I said 10 — and that water does not drain immediately off towards Brighton, a few miles off, when it rains, it does not drain down here immediately; it drains here gradually. The rain fall that falls in this Valley — itself raises the soil water and

retards to a certain extent
 the hydrostatic head that
 would otherwise send the
 water from over Brighton.
 As the evaporation goes on then
 that water, the drainage
 water comes in; comes in
 in precisely the same way
 that the river water rises
 and falls. Why does the
 Sacramento rise? It rises
 over on the high Sierras,
 given the rain. Why does
 the water rise in this valley?
 It is a little river itself
 parallel with the Sacramento,
 if you like, only you have
 filled it up, and it seeks
 its drainage back here. You
 have filled up the only drain-
 age of the place, this little
 river, we may call it the
 little Sacramento if you like,
 which is parallel and run-
 ning right down.

How do you understand
 this: that when there has
 been but slight rain, the

rise of surface water some several feet above the soil of an excavation and its rise higher nearer the river

A I do not know it to be so

I have you investigated that question? A I did

I have did you investigate it?

A No! I say I do not know it. I should not have said I investigated it

Q You did not investigate it? A No, I did not investigate that subject. I do not know that it is higher

I have can you tell whether or not the soil water beneath the soil comes from the river without you actually investigate that matter, by going down to the surface of the soil water itself; not the mere rain water that is in the top soil, but the soil water beneath the surface?

A I will give you one or two little accidents I have had

that shows me and proves to me conclusively that it is not seepage from the river. Down near the gas works there is a pool of water in very near proximity to the river itself or the Embankment. I have made two careful surveys of that and had a surveyor there to check me. I find that the surface of that water is ⁴ feet lower than ^{surface of the} ~~the~~ water of the river.

Q Where is that?

A At the gas works.

4 ft 9 inches yesterday morning.

Q Is that an extraordinary change?

A I do not know. If it is seepage water — there is close connection and water will seek its own level. There is nothing there to prevent it running away, because the pool is much deeper, it has an Embankment all around. There is a place where it gets to

a certain height which leads out, but it does not run out. If I place water in a bent tube, I can not get the water high on one side and down in the other.

2. Is it a very strange thing that sewage water does not rise as fast as the water in a river from which that sewage comes?

A I can only tell you this and answer your question thus: It seems to me to be far more reasonable with these physical facts staring me in the face, that the sewage or drainage water comes from the air, rather than from the Sacramento River. If there was such a state of things here as the water percolating through the levee in every direction I think you would have a very sad state of affairs here.

2 That is a mere theory

is it not?

A No, not at all. It is what any reasonable man would conclude.

I That is reasonable from your stand point, but that is mere theory is it not?

A No, not at all. It is a reasonable conclusion.

I Have you investigated where that water comes from?

A Yes. I find that there within less than 200 feet - I do not know but less than 100, I did not measure the distance, it is very close - on an abrupt embankment coming down from the railroad, the water is 4 ft 9 inches lower than the surface of the water in the river. There is the logical conclusion so far as that is concerned with my knowledge of the laws of water - that water seeks its own level.

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I But if you go back from

the river 100 yards farther
and find that it is still
6 or 8 inches lower, you comes
find according to your theory
the water running up hill
toward the river comes you
not?

A Not at all,
Water won't run up hill.

I That's what I say.
I say, if you find the water
— I will not call it seepage
but soil water — is highest
as you approach the river
then your conclusion necessa-
rily is that it comes from
the river, is it not?

A No. I will illustrate
that on a piece of paper
and then you will see it at
once.

I You can answer the
question? A No! I
can not answer it except
by making an illustration

I You can answer me,
whether or not your conclu-
sion would be that it came
from the river, if it were.

highest near the river?

A You put answers in my mouth. I do not draw that conclusion. You drew it for me.

Q I ask you if it would not be your conclusion that the water came from the river, if you find it was highest near the river?

A No, not in the condition that I have investigated, this matter here.

Q If you find as you recede from the river, the water gradually falling, becoming lower underground, it would be your conclusion that that water did not come from the river. Is that the fact?

A If I find, of course, that there was a stream of water running from the river, why of course it came from the river.

Q If you find seepage water -
a [Int.] I do not find seepage water

2 Not surface water but soil water. If you find soil water under the soil that went down and became lower as you receded from the river, what would be your conclusion? Would you say this water comes from the river, or comes from a different direction?

A That it comes from a different direction. If I found no relation between the height of the soil water as you call it and the river water I would have to seek some other cause.

2 But suppose you do not find some other?

A I shall not suppose any thing. I give you facts now

I will call this the River; I will give you this as a Circumstance. There is the soil water running, starting, of course, off lower than the water in the River, starting here ten feet from the River or twenty or 30 feet from the River and running out in this way; not running, but going in that way. You find that there is a gradual fall in the water as you recede from the River. Would your conclusion be that that water came from the River or from some other point?

A Yes. Under the hydrostatic head as you find it there it would be impossible.

It would not be your conclusion that it came from the River?

A No. The condition of things you will find as here (pointing) here I find the high bank. Here you go down to the Sacramento River. Here is the Rail

Road tracks standing a
 little above the Gas works.
 Then from there is a very
 abrupt embankment. Now
 here I find a floor - I will put
 it that way - a little floor.
 Now I find that there is
 water standing right in
 here close up to this bank.
 I find that the River water
 stands right there, with ref-
 erence to the surface water,
~~in the first place~~; that being
 4 feet 9 inches lower than it
 is in the River. Here I find
 this condition of things at this
 point; a good solid Clay;
 because they evidently had been
 using it for making brick;
 had been excavating it for
 brick. Here I find when it
 comes up a certain height
 there is a box to carry it
 out into another little adjoin-
 ing Lake over here. Now I
 find this is several inches
 below that; and with a very
 close survey the difference in

the elevation between this little Lake and this adjoining it is only one inch and that may be due to evaporation, being more shallow or anything of that sort. Now I say in that close proximity it is not reasonable that the water should come from there; especially when I see behind me this enormous drainage coming back this way.

Q You are explaining one theory and I am asking you about another all the time. A Now there is your drainage Canal a little down from this point and flowing the water at a certain point. It is just as right to say the seepage water comes from that as from this, especially when I see that state of facts. Q Now we will take this as the water of the River, say the River is nearly bank full at that point. You find here that the water in an excavation

is of a certain height, going 50 yards back you find that it is of a lesser height, going 50 yards you find there is a gradual decline, going further back you find the water gets less all the time?

A I know of no such condition.

Q But if you should find that condition where would you say the water came from?

Ans Belcher We object to that as not in cross examination.

A I never saw such a condition.

Q What would you say?

A I would want to find out whether there was a higher source of water on the other side.

Q No? Suppose there was not a higher source?

A Certainly then it could come from nowhere else. It must come from the River then.

Mr Belcher I have objected to this as not cross examination.

Mr Hart It is cross examination.

Mr Belcher It is assuming a

Condition of facts that has not been shown here.

The Court That is not uncommon in examining an expert. That is a very ordinary proceeding.

Mr Harr now you say that as you raise the soil water disease decreases; as you lower it disease becomes more general and malignant?

A yes.

Q That is Typhoid diseases?

A yes.

Q Is that true both with reference to the city and the country?

A It is a universal law.

Q Where do you find that universal law stated?

A I will refer you to some of the authorities on that subject:

The sanitary record of London England; the Sanitarian, a periodical devoted to sanitary

measures in the United States; Denton on the sewerage of towns and cities and villages; Latham on Sanitary Engineering - two

Volumes just out; Buck on Hygiene and public health; And French and German periodicals on the same subject.

Q When did you read these periodicals on this subject?

A I have always been reading them. I have been receiving the Sanitarian published in the United States ever since it came out.

Q Have you not read up in this subject since the testimony of the physicians was given in this case?

A I have read it more closely; but it was simply my own knowledge I knew that there was some incongruous matter thrown in that as would be very naturally be the case.

Q That being true why is it you say the drainage of this city is incomplete and no drainage at all because there is not sufficient fall to carry off the soil water

A That is the Reason you have got no fall here.

Q Why do cities undertake to drain off the Soil water if disease increases as the Soil water falls?

A You do mean to put that question as you.

Q Yes I do mean to put that question?

A Then I will explain it to you. Soil water of course is the accumulation and filth of cities which have neglected to sewer. If we knew just exactly where a city was going to be built and knew its size and had a treasury to draw on of millions cities would be sewered to begin with, but a sewer becomes a necessity only later on and these observations have been made with reference to the water lowering and falling. of course it is not usual to go on and accumulate filth year after year

getting worse and worse, you have to get rid of it.

Q And to do that it is necessary to drain the soil water?

A Yes.

Q And if you do not drain the soil water disease ^{increases} instead of decreasing?

A Certainly.

Q And therefore anything that obstructs the drain of soil water or increases the amount of soil water in a city increases disease?

A Yes if the city is not sewered.

Q Therefore it is not true that it is generally the case that as soil water goes down disease becomes more prevalent?

A Why of course I mean that in places where there was no public sewerage, of course where there is a public sewerage there is no disease, there is nothing to produce it. It is the fact of this fecal and

It does not necessarily follow that there must have been malarial before a typhoid, because a typhoid may exist on the top of a mountain if they neglect the sewerage. It does not matter where it is; it happens very often near a farm house.

Q Are you a graduate of any Medical College

A I am. I am an M.D. of the Poland Medical College

Q. of this State

A Yes

Q When did you graduate there

A Some time ago. They gave me an honorary degree. I was a professor of Chemistry there. I have made a specialty of Medical Chemistry ever since the year 57. I have prepared students for degrees at the Royal College of Surgeons, in the Chemical department, for a number of years before I came here and continuously

poisonous material rising there that causes it. Then the rising and falling of soil water becomes an important factor

Q Whenever you destroy the sewerage of a city and at the same time destroy its facilities for draining its soil water, you, to that extent destroy or impair the health of that city?

A Certainly you do.

Q You testify that malarial and typhoid diseases are the result of what?

A I said malarial diseases are generally found on bottom lands and rivers when the soil ~~is~~ is attempted to be put open for cultivation, and as that land continues to be inhabited by human beings and by the beasts of burden it necessarily follows, if they take no protection to get rid of their filth that the fever then becomes typhoid

have been connected with the Polana Medical College from the first year of its organization until the Medical College of the Pacific started since which I have been connected with that.

Q Now can you positively state what is the cause of typhoid diseases

A yes

Q Is that a matter upon which medical men are agreed, fully agreed,

A yes.

Q Is it not a matter of any speculation at this time

A Not a matter of speculation at all that it is a follower of filth.

Q And as you increase filth you increase typhoid diseases

A yes.

Q You was speaking this morning of quartz mills in this state. How many did you say there were?

A I think I told you there

About 2600.

Q Of which 2500 you said were quartz and 100 gravel.

A Yes. Somewhere about that. I may have escaped some few; may be more.

Q Stamps I mean, not mills.

A I mean stamps of course! The number of stamps at work.

Q Now these 2500 quartz stamps, how much did you say that they would crush per day work or reduce.

A They vary all the way from one and a quarter tons to the stamp to three and a half tons to the stamp.

Q How much did you make all of those stamps produce per day?

A I said somewhere in the neighborhood of 5000 tons.

Q Not 2500.

A No. Multiply 2600 by 2 and you get 5200 tons.

Q Did you not say from one and a half to two tons

to the stamp

A No. I said from one and a half to three tons.

Q Making an average of about two tons?

A Yes.

Q Which you reduced to years making one and a quarter million cubic yards per year

A Yes.

Q How many cubic yards per year is thrown into the streams and hydraulic by the hydraulic mines at placerville of which you are the president?

A Of which I am resident Director, not the president. I will refer to my Annual report and find the quantity of water that was used there in hydraulicking and tell you

~~Q~~ - We are using there about 80000 inches of water for hydraulic - 80000 that is for hydraulic alone -

Q - That makes 320 -

A - That will remove say four Cubic Yards to the inch - Then we are using for the gravel Stamp - We are using there about 30000 inches of water and for miscellaneous ground sluicing and small claims etc. we use about from 5000 to 75000 inches of water. It would be fair to put it down at something like 25000 inches of water for the year - removing four cubic yards of material

Q - That would be 100,000 cubic yards per year

A - Yes.

Q - Was that in the hydraulic mine alone?

A - That is not one

mine - There is a series of them - There are dozens of mines there which work more or less -

Q - What is it you call that place? A - That one mine where we use the most water is Coon Hollow -

Q - Near Placerville

A - Yes.

Q - How many mines are there there mined by your Company A - Where we are mining at Coon Hollow?

Q - At Coon Hollow. A - There are two mines that we have got there and we are mining ground at a place called Loomis's place. There we are mining on shares

Q - You gave me first one mine that had 8000 miners inches another that had 30000 miners inches and another that had 50000. A - I could

possibly tell you exact amount. We are using there 250,000 inches of water in that section of the country -

Q - In that section of the country. A - Right at Placerville, on the Placerville ridge, in and around Placerville -

Q - Around the Placerville ridge you are using 250,000 miners inches of water A - Yes -

Q - With a result of four yards to the miners inch, four cubic yards which makes one million or rather one hundred millions, one million cubic yards per year.

A - Yes

Q - As many cubic yards as are thrown into the Rivers and worked by all the quartz mines in California A - Yes -

Q - Did you estimate in

your testimony today the amount of dirt thrown into the Streams by drift mines A - No Sir I did not make an estimate -

Q - You did not make an Estimate A - No Sir

Q - But you stated the mines generally A - I said there were a large number of mines -

Q - Have you ever made an Estimate of that kind A - Not in detail, only of some special properties -

Q - Is it not a fact that all the drift mines that tail directly or indirectly into the American River or into Streams that carry the tailings of the drift mines into the American River - There are not enough of them all combined to cast as much material into the River as is cast into the River by the Gold Run

mine alone A - No Sir
that is not true -

Q - That is not true?

A - No Sir.

Q - Now where do you find
drift mines on the American
River taking all combined
which will cast as much
material into the River
as this one mine A - I
will commence -

Q { Intg } I am speaking of
those that cast their tail-
ings into streams that will
carry the material into
the River A - Certainly.
Simply on the water sheds
of the Americans -

Q - There are some of
those streams there which
have a fall of a foot
to the mile and of course
they will not carry
anything A - Of course
you will stop and tell
me when I get to the
shallow streams. I do
not know them. I do

not know of any shallow Streams in the mountains. They are two thousand feet above the level of the Sea and the Streams are always precipitous. None of them are shallow Streams -

Q - Is not there a Stream there known as Cedar Creek

A - Yes -

Q - Has that a heavy grade

A - Yes that has four inches to twelve feet

Q - Is there a Creek there known as Deer Creek

A - Not at Placerville

Q - Where is that located

A - There is a Deer Creek in every mining section of the country and I do not know which you mean.

Q - Is there not one up there A - No Sir

none that I know of there - I have been there for twelve years continuously.

I suppose there is a Creek
here that is called
Deer Creek -

Q - That is the main Creek
upon which the main
mines are located A - No
Sir that is not Deer Creek.

Q - I mean the main
Creek upon which all
the mines or nearly all
the mines in Eldorado
County now at work
are worked. A - I will

help you out in that - It
is Weber Creek, Not Deer Creek.
The two Creeks where most
of the work is done is
Hangingtown Creek and Weber
Creek -

Q - What does Weber Creek
empty into - A - Into the
South Fork of the American
Q - Directly A - Yes

Q - What empties into Weber
Creek A - The various
forks of Weber Creek

Q - There is another Creek
is there not? A - No Sir

there is no other Creek -
 Q - These witnesses have particularly described this creek in their testimony this Placer County Witnesses, I mean the Eldorado witnesses A - Here is a very accurate of that region of the Country and there may be a little Creek there called Deer Creek but it is not in that drainage. Here is Weber Creek <pointing> It comes right down here and these are called forks. That one comes up to Sportsman's Hall and most of the mining is on that Creek. You go up Hangtown Creek to Spanish Creek -
 Q - That empties into Weber Creek A - Yes. Those are the two main Creeks that drain that place and the most of the mines are on those Creeks -
 Q - They empty their

tailings a long distance from the Creek itself that is from three quarters of a mile to a mile and a half A - No Sir. Here we have one the Excelsior mine and here is Chili Ravine And this little Ravine here is Stony Ravine (Pointing) and the mine is right there -

Q - How far from the Creek A - It cannot be over a half a mile

Q - The tail piles are some distance from the Creek

A - Yes we have dammed them up with brush dams. There are several years work that we have dammed right up - and it has never moved it is right at the very edge -

Q - That is not in the Creek A - Yes right at the Creek at Merrill's Bridge

Q - What mine is that?

A - The Excelsior mine.

That is Marrells Bridge

Q - Where are those other mines on Weber Creek?

A - Up at Newtown they are tailing onto here {pointing}

Here is the South fork Weber and this is big Chunk Canyon - It comes up towards the Eight mile House {pointing}

Q - What do you say is the grade of Weber Creek?

A - It is very irregular. very irregular - I will show how it stands - Right up here by Sportsmans Hall it is very precipitous. here is the Weber Canal - Weber Canal strikes it at that point {pointing} -

Q I want to get at it generally A - I will give it generally. I know the elevation of the ditches and I will give it to you. It takes the water at that point and when the ditch comes down to the

Excelsior there, that is about
 five hundred feet higher than
 the bed of Weber Creek at
 that point. In Eight Miles
 the fall has been five
 hundred feet that is without
 counting anything for the
 grade of the ditch itself
 Q - Five hundred feet in
 Eight miles at Placerville
 A - Say four hundred -
 It is very precipitous -
 Everyone who has been
 around Hangtown knows
 exactly what the grade
 is - Upon Hangtown
 Creek and Placerville
 is on a ridge -
 Q - Going further up
 that Creek what kind
 of a grade do you find
 there A - Well here it is
 Q - I mean further up
 the Stream A - Yes I
 have been further up. I
 have gone to the source -
 Stop a moment - I will
 tell you from there up

to Sportsmans Hall a distance of three miles and a half - From that point up to Sportsmans Hall there is an elevation in that three miles and a half of nearly a thousand feet. That is up to the very Source of Weber Creek -

Q - Now coming below the Excelsior Mine what is the fall there? A - Below the Excelsior Mine I should think the grade there would average all the way from twenty to fifty feet at various points. It will run flat for a while and then it will be very precipitous and there are boulders and rapids in it and then it comes to a sudden Stand Still. I think the fall will average about some where between twenty five and thirty feet on an average from the points where the Excelsior Mine dump into the Weber

until its junction with the Southfork of the American River -

Q - Immediately below the dump of the Excelsior mine it is flat is it? A - No. Sir it is not so very flat. I could not tell you - It is filled up with tailings. I do not think it is very flat and I will tell you why.

The Chinamen have got in there and they have their sluices and they are high enough to give them a very good head when they are washing. I have seen the grade they give to their sluices and I think there is a pretty good fall there -

Q - You were proceeding to give me the mines that cast more material into the American River than is cast into it by the Gold Run Mine A - Yes

Q - That is placer mining not hydraulic A - Yes

Q - Duff mines A - Yes.

Now there are at Damascus two mines that are working there -

Q - Are they at work now?

A - Yes and about fifty men are at work there

Q - What is the annual discharge A - Well these men are equal to about three tons a day -

Q - Which means how many - Three cubic yards you mean? A - No Sir three tons. That will be a ton and a half - a cubic yard is about a ton and a half - You can put it at that and figure it into cubic yards

Q - That would be about two cubic yards each A - About two cubic yards - That is right -

Q - Two cubic yards would be three tons A - Yes that will do -

Q - And fifty men A - Yes

Q - That is one hundred

Cubic Yards per day A - Yes
 Q - That would be thirty
 thousand Cubic Yards per
 year A - Yes -

Q - Working three hundred
 days in the year A. Yes -

Q - If you put it at that

A - They generally work about
 that -

Q - Do they at Damascus

A - I do not know it of
 my own knowledge -

Q - Have they worked three
 hundred days in the last
 three years A - Yes they
 are very steady boys who
 work there and I never
 was there when I saw any
 loafers knocking around -

Q - Conceding that they worked
 three hundred days in the
 year that would be thirty
 thousand Cubic Yards a
 year A - Yes that is
 one mine then there is the
 Rising Star running at
 Iowa Hill. I believe
 they have about twenty

five men at work there

Q - That would be half that much A - Yes -

Q - Fifteen Thousand A - Yes. There is the hidden treasure they have got about fifty men there. They will move more material there. They can get rid of it better. They will probably equal about four tons to a man there - Say two and one half cubic yards that is near enough to it. There are the mines around Last Chance. There are about fifty men at Last Chance proper, about fifty men drifting there -

Q - How many would they remove A - They would do about the same. That is the average. It is near enough to it. Take it right through at two cubic yards to a man that is good as any way. There are around Canada

Hill about twenty men
at work generally -

Q - Twenty men about Canada
Hill. A - Yes - And at Deadwood
there are ten or a dozen say
ten men -

Q - Ten men A - Yes. And
there are mines - There is
a hydraulic mine at Last
Chance that works generally
three or four months in the
year -

Q - That is a hydraulic mine.
I am speaking of drift
mining A - The next mine
is down at the Hidden River
the Weske Mine. They have
got generally about ten
or fifteen men. At the
present time they work
say ten. And there are
about fifty men in and
around Michigan Bluff
And there are small drift
claims besides that. Coming
down now to the Paragon
Mine at Bath they are
working there crushing

I Could not tell you the Number of men there but they keep twenty Stamps at work —

Q — What is that a drift mine A — Yes the Paragon Mine

Q — Twenty Stamp? A — Yes. They do not crush only about three tons to the Stamp.

They crush a little finer than the balance of them

Q — Sixty tons a day how many Cubic yards would that be? A — I do not know I am not good at mental Arithmetic —

Q — How many tons to the Cubic yard A — A cubic yard is a ton and a half

Q — That will be about forty — Mr Belcher. It is just forty.

A — Then as you come down towards Forest Hill there is a mine called the Excelsior. They have got about twenty men. That is at the Forest Hill Ridge. And there is the Jersey and

the Hope and the Baltimore
 and the Green Springs — There
 are probably thirty men engaged
 in them altogether somewhere
 about that. Then we come
 down to near Auburn
 and here are thirty stamps
 crushing quartz and tailing
 into the American River.
 Mr. Hart. That is Quartz
 Mining. I am speaking of
 Drift — A — There are probably
 on the Georgetown Ridge fifty
 men engaged in drifting all
 told in the various little
 mines there — Then coming
 over to Placerville —
 Q {Intg} You have been there
 once — A — No sir not on
 the Drift mine. You want
 to know now the drift
 mines tailing into the American
 Q — Yes — A — There is fish
 of all the Lyon Mine
 which has twenty stamps
 which will crush about
 Eighty tons a day and there
 is a Cedar Mill with ten

that Crush about forty and the ten Stamps of the Eldorado Water they will Crush about three tons and a half some thirty five tons a day, and the Penfeldt Mine ten Stamps that is Crushing about forty tons, and there is another one -

Q - {Intg} Are those quartz

A - No Sir Drift mines I am giving you now. And there is one called the Ames Mill he has ten Stamps at work there and there are some more Stamps making a total of about ten, I do not know their names -

Mr Pelcher Have you mentioned the Pond - A - The Pond is a hydraulic mine. I was limiting it to the drift mines -

Q - That is a thousand yards or so - A - I do not know Sir I have not figured it up -

Mr Hart How much a day

does it make Mr. Smith

Mr. Smith About four hundred and fifty thousand tons?

Q - That is for a whole year. Mr. Allardt makes it about a thousand.

Mr. Smith - It would be about fifteen hundred tons a day -

The witness, That would be about a thousand cubic yards a day -

Q - Mr. Hart. I will ask you if there are not several hydraulic mines in the State each of which discharge as much as a thousand cubic tons a day A - A Thousand Yes -

Q - Does not the Gold Run discharge at least that much

A - I do not know what its discharge is. I believe the estimate was about six hundred thousand cubic yards a year -

Q - Does not the Excelsior discharge more than a thousand yards a day

A - What Exclusion?

Q - At Placerville. Is not there one near Placerville

A - No Sir I do not think that mine alone does. I know it does not. Because we do not work it continuously. Let me explain to you one thing there.

Those mines are not one mine but a group of mines and we have only a limited amount of water and say one mine works today another mine will work tomorrow and at a certain time of the year a large portion of the water is used for power and in the summer time a great deal is used for irrigation. I could not tell how much was used for hydraulic mining alone.

Q - You say there are several hydraulic mines in this State

that discharge more than a thousand cubic yards per day A - Let me have one moment to think on that - An inch of water will discharge four cubic yards - Yes -

Q - It would take two hundred and fifty inches - A - Yes but in a very different State In a very different condition - A very different condition - In these mines there is not over twenty per cent of the material that is as fine as the material in the drift mines - In the drift mines it has been separated and all the Cobble Stones and hard rock there are left behind

== X ==

Recess until January
13th 1882 at
9.30 o'clock A.M.

In the Superior Court
of the State of California
in and for the County of
Sacramento.

The People of the State of California	}	Morning Session
vs.		Friday
The Geo Run Ditch and Mining Company	}	January 13 th 1882

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Winifred J. Davis
Official Reporter

In the Superior Court of the
State of California in and
for the County of Sacramento

The People of the
State of California

vs.

The Gold Run Ditch
and Mining Company

} Friday
Jan'y 13th 1882

} Morning
Session }

Cross Examination
of
Thomas Price

<Resumed>

Interrogatory Q You say that
in quartz mines the
stamp is used to crush
the material to a very
fine sand?

Yes

Q What is the stamp
used for in gravel and
hydraulic mines?

A For pulverization

Q What part of the material in a hydraulic mine does the stamp pulverize?

A The material that is taken out of a drift mine is the gravel. It is very seldom that rocks larger than my fist are taken out of the mine. So the material which is thrown behind will generally fill up the whole space. It is only this gravel material that is between the rocks that is crushed.

Q That is in drift and hydraulic mines?

A They do not crush in hydraulic mines.

Q They do not crush in hydraulic mines?

A Let me explain there that I am taking the word hydraulic in a broad sense or rather, I should say in a limited

sense, namely the moving of the material by the aid of water. - When I speak of drift I simply mean that portion excavated out the same as in mining for coal, that is crushed by a stamp. They never need a stamp in a hydraulic mine properly speaking.

Q But in a great many hydraulic mines where the ordinary process is the removal of the material by hydraulic process they do crush some of the material that comes out?

A Not under stamps

Q Do you testify that they do not use stamps in any hydraulic mines proper? A Not simul-
taneously with the operation of hydraulic mining

Q I do not ask that. I

ask whether they use the stamps there, whether simultaneously or whether it is seven months afterwards. Do they not use stamps in hydraulic mines proper — what are known as hydraulic mines?

A I do not understand your question. General I will answer it if I can.

Q You need not answer it if you do not understand it. I will put it so you do understand it. I ask you whether they do not use stamps in mines worked by the hydraulic process as that term is now technically understood: the driving down or knocking down of large banks of material with water and powder?

A Crushing it with stamps you mean?

A afterwards — yes

A I do not understand

you. I know of no instance to explain. I know of no instance where the water has first been applied on the gravel bank and removed the material into the sluices so as to perform the operation of hydraulic mining so called and then picking up that material and crushing it with stamps thereafter.

Neither do I know of any operation where the material is first moved from the bank by the aid of water and forced in under the stamps so as to be crushed simultaneously with the operation of hydraulic mining.

Do you know of any instance where the material had been moved by powder and then crushed with stamps and then moved by the hydraulic process?

Ayes

Q You do know that?

Ans. Not where moved
by hydraulic process.
Repeat the question please.
I will recall the answer
I gave.

<The question is read by
the Reporter?

A <continuing> The only
instance I know of in
that respect was at a
place called French
Coral, where they quarried
the upper stratum, ~~that~~
softer material had
been washed in previous
days down to the hard
cemented gravel. There
they quarried it for a
number of years, quarried
it out and crushed it in
a stump mill. Of course
the power of water had
to be added to carry it
away in sluices the same
as anywhere else. That
is the only one I know
of that approaches to the

stamping of a bank of gravel

Q Taking a mine such as the Gold Run mine which is known technically as a hydraulic mine, as distinguished from drift mining, seam mining and quartz mining, is it not a fact that in such mines where it becomes necessary in order fully to disintegrate the material containing the gold, they use stamps and other means for the purpose of crushing the hard material that is not susceptible of being worked fully by water power? A I do not know of any such place

Q You do not? And not where stamps are at all used

Q Do they use sledges? A Yes. They use sledges to break up the material

into pieces large enough
to be removed by the water
in the sluices

Q I will ask you as an
expert whether it is not
the object of all hydraulic
and other miners to fully
pulverize the sand and
Cement that holds the
rocks together and fill
the interstices?

A Yes, that is the object.

Q And in nearly all
instances, is it not true
that they do to a very
great extent if not entirely
accomplish that purpose?

A That depends consider-
ably upon the character
of material to be moved.
If it is not very hard,
very much cemented
they accomplish that object.
If it is much cemented
they do not accomplish it.

Q They do not accomplish
it at all?

A To a very considerable

extent they do, but do not accomplish it thoroughly.

Q There are a few pieces left that are not disintegrated.

Ans: Considerable left.

Q Considerable? Cries

Q In the streams and creeks along the American river and in the American river itself can you find any considerable amount of this cement that has not been disintegrated?

A I noticed quite a number of places where there were masses of cement about the size of this piece here, [pointing] lying right in the gravel, undisintegrated.

Q Where did you notice them? A Between Pickering's Bar and Rice's bridge.

Q Where between Pickering's Bar and Rice's bridge did you notice them? A I did not charge my memory with any particular

place I only saw them promiscuously scattered in various places

Q If the Superintendent of a mine should throw this blue material into a stream in the condition in which you see it there without pulverizing the cement, he would be guilty of gross neglect of duty would he not?

A I do not see that it would depend much on the Superintendent, if the material is so hard

Q He is boss of the mine is he not?

A Yes But then he cannot exercise superhuman power

Q Do you say it would take superhuman power to pulverize this cement here? A Yes. It could not be done by the process of hydraulic

mining. They have to
 trust entirely to the grade
 they have and to the
 water to aid their work.
 The Superintendent cannot
 be responsible for the
 pulverization of the
 material over which he
 has no control.

Now about this sledge
 hammer process you
 speak of? A steamer
 has to break it down
 by the sledge hammer
 process so that it will
 be easily moved along
 by the water. It is
 necessary for him to
 do that in order that
 he shall not use his
 water to disadvantage;
 that the pieces shall
 be small enough, that
 there shall be no choking
 of the flumes. Because
 if he runs too large a
 piece in what is the
 tendency. The tendency

is to block up the flume and lose this is three hours work of the sluice and a large volume of water. The Superintendent has to be guided in that respect by two conditions 1st. the flume, the size of the flume and the grade of the flume and then the volume of water at his command. If he has a large head of water, which is sometimes the case why then they play it on it and crush the material very fine, breaking it up in small pieces.

Q They can shut off the water when it is necessary and crush the hard material can they not?

A This breaks it up. They just break it up; there is no crushing; it is

simply a breaking of it up. There is no pulverization in the real meaning of the word going on in any bank where the operation of hydraulic mining is conducted.

Q Where is the pulverization going on?

A The pulverization takes place of course while it is travelling on its road through the tunnel and into the Canon.

Q It travels with great force through the tunnel does it not?

A Yes.

Q After it has gone through this process, is it not true that the great proportion of this cement has been pulverized?

A A very large portion of it has.

Q About what proportion?

A The proportion will

vary in different places.
 The inference ~~is~~ that
 I have drawn from
 the result of my experience
 are these: that the quan-
 tity of material removed
 from blue cement that
 is crushed and reduced
 to a sand will vary
 from 10 to 25 per cent

Q Vary from 10 to 25
 per. cent of what?

A of the whole material
 that is moved.

Q of the rock and material
 ages, disintegrated.

A But I speak of the
 blue cement itself,
 not the rock which is
 cemented but the cement
 itself.

A Now you will find
 here in looking —

Q Sub's? One moment,
 I want to know of you
 whether or not nearly
 all of that cement is
 pulverized by the

hydraulic process and other processes resorted to in hydraulic mines?

A No the whole of this is not.

Q I did not say the whole of it.

A It will vary I told you from 10 to 25 per cent.

Q of the blebe cement and or rock and cement?

A No of the cementing material.

Q then they leave 75 per cent of the gold in the rock after it is washed out.

A No. I do not mean to say that either.

Q They leave 75 per cent of the material and the material contains the gold?

A Just understand me now. I say first of all the cemented material contains from

10 to 25 per cent of the whole mass. Now that cemented material is not all fine material. It is composed of fine grains of sand all the way up to the size of peas and beans and of course according to the transporting power of water that will be more or less carried away depending entirely -

Q Entirely? But it is all reduced to very small proportions, this cementing material?

Absolutely.

Q So that the rock itself is cleaned of the ordinary cement?

A Yes, to a considerable extent.

Q Well there is 99/100 of it is there not?
A No.

Q How much is?

A I do not think there

is over 50 to 60 or 75 per cent varying according to the character of the material. That would depend very much on what the nature of the cemented material is itself. The cement is not fine material; that is merely a very small portion comparatively speaking that is ~~fine~~ that. It is made up the same as cement concrete is made at the present day.

Q If this material is left in small pebbles instead of in the form of sand would it or not be more easily transported?

A It would be transported to a greater distance

Q If it were what?

A In proportion to the size of the pebble

Q If they were very small pebbles it would be transported as far as sand would it not?

Ans, a pebble that is the size of a pea will not, cannot be removed by the same volume of water as far as a grain of sand the size of a pin head

2 But there is always a volume of water, enough in the American River, with its grade, in the winter time to remove a pebble; is there not?

A No sir.

2. In the North Fork?

A. No sir, the conditions necessary to remove will depend a good deal upon the bottom. The bottom of the American River, at that distance, that you are saying, is filled with these large boulders varying from an inch to two ~~to~~ or three up to six or seven or eight inches in diameter. That is the kind of bottom that there is there, and consequently that offers resistance in the way of friction, the same way that it would be if you were to move a ball along a smooth floor you could move it along very easily. But attempt to move the ball over a bed of pebbles and then you would see the difference.

2. When you find current suffi-

ciently to raise that in suspension partially, does not that diminish the friction on the bottom?

A. Not to the same extent, as the air but relatively it is the same. Less resistance is offered. Yes sir, that is self-evident.

Q. When water is running from 15 to 24 miles an hour, will it not carry a pebble that is an inch in diameter and carry it with ease.

A. Yes, if the floor or bottom is sufficiently smooth.

Q. Well, won't it carry it above the bottom?

A. To illustrate that I will tell you —

Q. (Interrupting.) The question is would it not carry it above the bottom?

A. It will under certain conditions and the conditions are these: That all the experiments with reference to the transportation and movements of bodies have been made on planes, perfectly smooth planes or in

troughs without any mechanical hindrances whatever. When a river has a fall of 56 feet to the mile, without any friction obstructing it in clear water, then water will remove a pebble that is from three to four inches in size.

Q, Would not it remove a pebble that is three feet in size?

A, No sir.

Q, It will not?

A, No sir, not even on a plane.

Those are the experiments that have been made.

Q, Now, I will ask you this question: Is it not a fact that the water on a smooth level, with a fall of 56 feet to the mile, running at a rate of 15 miles per hour, will not carry a boulder over a perfectly smooth surface, a boulder weighing a thousand pounds?

A, The authorities - all of them, and there are well constructed tables -

Q. Int'g. > That is a question that may be answered by "yes" or "no".

A. I say no. The moving power of water is as I have told you in that proportion that a pebble from three to four inches in size only can be moved with a fall of 56 feet to the mile.

Q. Now, is the fall the only thing that determines the weight of the material which the water will carry?

A. Certainly it is.

Q. Does not the depth of the water and its consequent increased velocity have as much to do with the carrying power of the water as does the grade of the river or stream itself.

A. The velocity is governed entirely by the grade. You can not get a thousand mile current only under conditions that the grade is sufficient. Water will only run so fast according to the

grade.

Q. I will ask you, when you say that the velocity of the water is controlled entirely and solely by the grade -

A. Yes sir.

Q. - Is it not controlled as largely by its depth as it is by the grade?

A. The depth and volume - depth and volume of course under certain conditions.

Q. So that a fall of of 56 feet per mile, with a very slight amount of water, would have very much less velocity than a fall of 56 feet per mile with a great amount of water?

A. Of course the condition I gave on the plane surface is when there is sufficient water to cover the stone - when it is all submerged.

Q. What is the grade of the flume of the Gold Run Ditch and Mining Company?

A. That is six inches to twelve feet.

Q. How much does that make per mile?

A. That is half an inch to the foot. Divide 5280 by 2 and you have got somewhere about 2640 and 2640 and 2640 inches divided by 12 and you have got the number of feet to the mile - 220 :- that is self-evident.

Q. How deep is the water in that flume?

A. That water in the flume I suppose is about 18 inches to two feet.

Q. What would be the difference in the velocity between the water in that flume and the water in the American River, with a fall of 30 or 50 feet to the mile when the water is 60 feet deep in the river?

A. A very considerable.

Q. A considerable difference in velocity?

A. Yes sir.

Q. On which side?

A. The velocity would be much smaller if ~~the~~ the water moving

in the river of course than it would be in the flume.

Q. How do you determine the velocity of water in the stream?

A. The velocity in the stream I determine — There are instruments by which you can measure its velocity: that gives a certain number of revolutions and regarding the number of revolutions that a little fan will make, recording itself on a dial.

Q. Are there not some mathematical formulae from which those things may be determined?

A. Yes sir; there are mathematical formulae.

Q. Now then what are they?

Mr. Belcher. I object to that. This is not in cross-examination.

The Court. I believe he is proposed as an expert on the transporting power of water, was he not? I think you proposed him as an expert.

Mr. Belcher. I do not think I questioned him as to the transporting power of water.

Mr Hart. He is an expert on the transporting power of water and produced us such.

Ex. The Court I understood so. I over-
rule the objection. Note an exception.

Mr Hart 2. Now sir, I want you by figures to take the fall and depth of water in the flume of the Gold Run Ditch and Mining Company and the fall and depth of water, computing the water at 40 feet deep, in the American River in the winter, and 20 feet fall per mile, and calculate for the benefit of the Court the respective velocities of those two streams.

A. Well now in the first place, I will answer that question by simply stating that there is no formula in existence that will calculate the velocity of streams under the conditions that you have now mentioned. All experiments that have been made by mathematicians, in this direction, have been in quiet water, in still water; and on perfectly plane surfaces.

My experience in this direction has been guided by computing the quantity of material that a ~~sextant~~ volume of water will remove in a flume as applied to hydraulic mining. I find there that of this kind of material and the blue cement referring to - that all the way from two to four cubic yards of material can be moved by one inch of water in the 24 hours.

Q. That is not the question?

A. I am simply giving my experience. I know of no mathematical formula.

Q. I do not want your experience. I want this other thing that I asked you for. That is all.

Do you testify that all experiments have been in smooth flumes, or smooth rivers or streams with smooth bottoms?

A. Mostly sir.

Q. Well have they all been that way?

A. No sir, not all. Experiments

have been made, but they are all admitted to be only approximations at the truth, and I will tell you at the outset I know of no formula whereby I can take and measure the velocity and the carrying capacity of a stream with a torrent such as you have now mentioned and I am guided entirely by my observations in rivers and practical observations of the kind of material I have found in the river.

2. Do you know and can you state Cutler's formula?

A. No sir, I can not.

2. Can you state any formula by which you can determine the velocity of water?

A. No sir, I can not give you any formula.

2. I will ask you whether or not water, of a given depth and with a given fall, will not always run with ~~the~~ given velocity?

A yes sir, provided there would be no mechanical hindrances.

2. What would be mechanical hindrances?

A. The character of the bottom of the stream; the character of the size of the stream; whether the stream runs in a straight line; whether it bends and meanders through in a zigzag form or not.

2. Now, I will ask you whether or not a stream would not run with very much greater rapidity after it had ^{been} paved with cobblestones, than it would with its natural condition when it is filled with holes and with large boulders, forming a very rough bottom?

A. I do not think it would.

2. You do not think it would run faster over a paved bottom?

A. If it was perfectly paved it would.

2. Would it not run faster in proportion as you decreased

the ruggedness of the bottom?

A. Certainly it would.

Q. Has not the parring of this bottom - the bottom of the American River, with cobble-stones had the effect to decrease the ruggedness of the bottom of the American River between Rice's Bridge and Pickering's Bar?

Q. I do not know. I never saw that river in its original condition. If it is the same as the rivers I have seen elsewhere containing large boulders and masses of rocks, weighing many tons in weight that has come in from the sides of these ~~mountains~~ mountains, I would say no.

Q. You would say it had not been improved?

A. Yes sir.

Q. You would say it had not been decreased?

A. Yes sir, if the bottom of the American River between those points you have now

named is the same as the bottom of the South Fork of the American where there has been no tailings ever put in, simply the rough rocks that I have seen there, I would say no it has not improved it.

Q. If the paving of the bottom necessarily of course make a ^{regular} grade like the railroad grade up and down a stream, would not it decrease the amount of ruggedness of the bottom?

A. Not more than what I have seen in the beds of other rivers where there is no tailings.

Q. Don't you know that this stream like other mountain streams in its natural condition was filled with large boulders?

A. I suppose it was.

Q. Boulders from one half to ten feet in diameter?

A. Certainly; they have fallen in from the sides.

Q. Did you see the stream above

Cañon Creek?

A Yes sir.

Q, Could a wagon be run over that bed if the water were taken out?

A No sir.

Q, Could it be run over a paved bed made of these tailings?

A, In places it could yes sir.

Q, So that in places at least it has improved the bottom?

A Yes sir, but in other places it has thrown up bars that have obstructed the water, dammed it right up. I can readily conceive the condition at many points in that river where these tailings have been placed and formed dams and held the water back for a time.

Q, Don't you know as a matter of fact that there ~~has~~ is no place between Cañon Creek and Tolson wherein tailings have done any such thing as damming the water?

A, I do not know; I have not

been there when those conditions existed.

2. Do there any -

a (Inty.) Stop a moment please. I have not been on that portion of the river during ~~any~~ high floods, but I have seen elsewhere on the American River the tailings that have been thrown in the river, like they have been thrown in the North Fork, forming dams and every miner has done the same: so that there is a continual obstruction. The bed of the river is not of a uniform grade continuously. It makes a flat of it and fills up with tailings and makes it perfectly flat and the stream comes down there and it is retarded: first it crowds the material on to the dam there and then by and by it stops; and it will do the same thing over and over again: so that I regard

that there is a great friction.

Q. Is there any dam between Rices Bridge and Pickering's Bar?

A. I did not see any but there are partial dams cutting right-across, half way across the stream.

Q. There are sandbars?

A. No sir, not sandbars. Sand is mixed with it, but the bars are made of cobble-stones and material coming out of the mines.

Q. Is there in the bed of the stream any such thing as a dam?

A. No sir.

Q. Is not the grade regular from Rices Bridge to Pickering's Bar?

A. No, I do not think it is regular.

Q. How does the water go, up stream?

A. No sir, I simply say it is of an irregular grade.

Q. Then it would be steeper

in some places than in others.
 Q. Yes sir, it is a little steep
 and then flattens out:— I
 noticed that particularly.
 Do you say that in some places
 the grade is improved, that
 is the bottom of the river is
 improved?

A. Yes, it may be. I do not
 know. I did not see the bed
 of the stream. I can not
 speak as to that. I never saw
 the bed of the American River
 between Cañon Creek and
 Rices Bridge which, I suppose
 is made of these cobblestones.
 I can not say whether it
 is better. I have not compared
 it.

Q. It is better than the bed
 above there, is it not?

A. I can not tell you. In
 some places it is a little
 better. I only went up there
 a few feet. I will tell you
 one thing. It is no better
 and it is not as good as the
 bed of the river in the in-

-mediate neighborhood of the Damascus Mine where the Damascus mine empties into the South Fork. When Humbury Creek gets in there you find an enormous amount of cobble-stones and debris from the mine lying right in there. Q. Now, has not that, as smooth a grade as could be made with that material if laid with the hands of man?

A. No sir.

Q. It has not?

A. Certainly not; absurd!

Q. It is absurd?

A. Yes sir: - as if made with the hands of man!

Q. There have been some absurd witnesses on your side of the case ~~within~~ then, because they have so testified.

A. You say paving the whole stream across - that is the way I understood the question. Q. I asked you if there was not a regular grade that

would make a railroad grade from Rices Bridge to Pickens Bar — a regular grade, ~~over~~ ~~for~~ that would make a good wagon road?

A, No sir. The cobblestones there are irregular, forming a number of bars running right out in every direction.

Q, You say that is not so?

A, Not as a whole. In some places the grade is perfectly flat where the sands have all deposited and formed a perfect road bed.

Q A perfect road bed?

A, Yes sir. In some places, perfectly level there.

Q, Now you say that this blue cement, when it is put in the river will recement?

A, Well, if it is found in masses of gravel in the present river streams as it is in the ancient river streams, I can not see any physical reason why, under the same circumstances, the same effect will

not be produced.

Q, I do not ask you that. I asked you if you did not say in your examination in chief that it would recement.

A, It will reform itself and will recement itself.

Q, It will recement itself?

A, Yes sir.

Q, What is it that will make that material again form itself in cement, after it has been disintegrated?

A, The silica, which is the quartz; and the alumina, which is the slate, will utterly form cement.

Q, Well, why will it form a cement?

A, Because it is the nature of alumina and silica to form together and make silicates of alumina and harden.

Q, Does the water have anything to do with making the cement?

A, Yes sir.

Q. How much water does it take upon that kind of stuff to make it into cement?

A. There is plenty of water there already.

Q. Plenty of water in that?

A. Yes sir. It will come in this way: There is a bed of this gravel, coarse pebbles, and then the fine material will go right in, and then the water will run on top of it, and the water will be out of the river, and it will solidify and harden.

Q. How long will it take that cementing process to be completed?

A. I can not tell you, but it will do it.

Q. If you cannot tell how long it will take, how do you know that it will ~~do~~ do it at all?

A. Because I know the nature of the elements.

Q. Well, in your judgment how long?

A. No, it is not my judgment; it is a Chemical fact.

Q. Listen to my question and you will see what I am asking in your judgment, how long?

A. I have got no judgment on the subject.

Q. You do not know how long it will take to cement?
 A No sir.

Q Does it strike you as being at all strange that this Cementing material which you speak of is such fine agricultural land?

A Not at all.

Q It does not strike you so?

A No sir, because lime is a good fertilizer and is used in soil, and yet it makes good cement.

Q Certainly it does under proper conditions.

A Certainly under proper conditions. Under proper conditions it will cement itself but if you take Portland cement and spread it all over then it will not have a chance to cement and it will be as moist as so much loamy soil.

Q I suppose that you spread it on thick?

A It depends on the water

you add to it - water per cent
 passing through it. Water con-
 tains always in solution a
 considerable quantity of Car-
 bonate of lime and this will
 go down through it and will
 help to re-cement it

2 Do you not know that
 it that will re-cement its-
 self in stream, that it
 will re-cement itself if
 placed over agricultural
 land 5 feet deep? Or all
 of it except that which is
 actually subjected to cultiva-
 tion, it would all form cement?

A No sir, not under those
 conditions at all

3 Why will it not?

A Because it is a kind of cement
 that is only formed when it
 is pressed closely with pres-
 sure on it, as there will be
 when it is in a stream, for
 then there is the weight of the
 water and the heavy boulder
 on it. Of course you can
 take soil and you can make

Brick out of it, and you can take soil of any kind most and use it for mortar. It is used all over, and they make adobe out of it, but it does not follow that soil is going to harden by want of cultivation.

Q When you take that stuff and put it 5 feet deep over land of any individual and allow the water to percolate through it, will it not form cement as quickly as it will in the North Fork of the American River?

A No, not under those conditions. There would not be the pressure there that it would require.

Q What is the pressure that it would receive in the North Fork of the American River that it would not receive in the soil?

A The pressure of the cobble stones there, and the weight of the stream of water

2 How much heavier is the weight of the stream of water in the North Fork than the weight of the horses and cattle that are tramping during the summer season over agricultural lands?

A The cattle do not tramp over the field all the time

2 They do sometimes?

A Sometimes yes.

2 Do you not know as a matter of fact that if that comes from cement in one place it comes from it in another if subjected - if placed in water or if water was placed over it or under it and was percolating through it - that it comes from cement without pressure as well as with pressure?

A No sir, that material comes not. I can simply say that here is material which we find has cemented. It is self evident that it will reform into cement

under like conditions. It does not seem to me that that needs any argument at all.

2 How deep would you have to have the soil, and how great a pressure before this material would again acquire its cementing qualities?

A I suppose if you would take some of that finely pulverized material, and pack it under 15 - 20 or say 30 feet of earth, I suppose it would become again hard cement. I know it would.

2 Under 20 feet of earth a 20 lb weight enough - to give it 4 or 5 pounds pressure, continuous pressure, it will harden to an extent, but put 100 lb pressure on it and it will solidify to a greater extent.

2 This would not form a cemented bottom in this stream. A which stream?

2 The North Fork of the American River?

A It is forming it now
 2 Does it form it clear
 up to the surface from the
 bottom? A No, it

commences at the bottom and
 will come right up gradually

2 It keeps forming cement
 from the bottom?

A Yes, and it will come up
 gradually.

2 Until it forms cement at
 the top of the material?

A Yes.

2 Now why will it form
 cement at the top of the
 material in the river if it
 requires a pressure of 30 feet
 of dirt on it to make it
 cement?

A It comes
 up gradually. There is some-
 thing very curious in that.
 It is a chemical effect
 like you would put a small
 piece of liver in flour,
 it will leaven the whole.

2 But I want to know
 why it is that it will
 cement on top, without pressure

in the North Fork of the American River, if it comes require pressure in order to make cement on agricultural land? Now, understand me, there is another thing connected with the process of cementation which exerts an influence in the river which is the water, the salts that are held in solution by the water. Water contains silica in solution and it contains lime in solution and those materials percolate through the material and they form a portion of the cementing material, that is in the process of cementation.

Will it not cement without pressure? It will cement without pressure to a certain extent, but it needs a pressure to help it and the conditions to exist in the water.

2. How does it cement on top in the North Fork of the

American River if it needs
pressure? A Let me
finish my answer to the
first question.

2 Go on? A You ask
me how it is that it comes
cement at the top?

2 Yes. A I will ex-
plain that to you. The cobble
stones are dumped into this
canyon or the river whatever
you may call it, and finally
there comes in this fine ma-
terial and it fills up the
interstices in the bottom.
Through that the water fil-
ters and when there is no
water in the river, which
is quite often the case
that water will commence to
evaporate when there is
no water running in the
river. That evaporation
leaves behind what? It
leaves behind the silica,
the silicate of alumina and
the lime which forms a
cementing material - the

Cementing material of that
 kind of sand that is
 there and that will go on
 and it will keep coming
 up and pressure only ac-
 celerates it. It will do it
 in the due course of time with
 those - the salts that are
 held in solution in the wa-
 ter will form a cementing ma-
 terial and it will cement
 without pressure. Pressure
 only accelerates the opera-
 tion

2 If it will cement with-
 out pressure, is it not a
 fact I will ask you that the
 water percolating through
 that kind of soil, if deposited
 upon agricultural land will
 form cement?

A No sir, it will not, be-
 cause the soil itself is
 porous. It does receive a
 stream of water. The water
 there comes lie in the soil.
 It falls down 3, 4 or 5
 feet and remains in the

found what you might call
 found water and there it
 Evaporates and hence you
 find a clayey bottom or
 a hard bottom, resulting
 from the same thing, that
 would cement the bottom -
 the bed of the stream. The
 water would evaporate in
 the soil and not in the
 Cement material. There
 would be nothing there to
 Cement it and nothing there
 to hold it together.

Q What does the water do
 in the soil if it does not
 Evaporate?

A It goes down into the
 soil and forms a perfect
 water level and from
 there Evaporates. It Evap-
 orates in the form of vapor
 and it forms the Cementing
 material of the bottom
 - it forms the hard pan.

Q Do you mean to say that
 there is no such a thing
 as evaporation any place

Except under the beds of
Stream? A Yes, on the
surface every where wherever
there is water.

Q There is evaporation?

A Yes

Q Now does not the filling
of the soil by water, with
run drainage and so forth
and the subsequent evap-
oration leave the same
properties in the soil that
would be left by the same
process in the bed of the
Stream? A Yes.

Q And yet it is not cement?

A It is not cement because
it is continually cultivated

Q How deep is it cul-
tivated?

A It is cultiva-
ted on the surface, and breaks
it up all the time

Q Suppose you would cast
a foot of that kind of stuff
on the soil, over a man's
soil? A Yes.

Q Would it be cultivated
to a depth of a foot? A No.

2 Three feet? A Nostril

2 Two feet? A Nostril

2 One foot?

A I should think 8 inches or a foot.

2 Now then, but this cement matter is that you speak of in the earth, if it cements rocks, hard rocks in the bottom of the stream why will it not cement them in the earth?

A Because the conditions are not alike. There is a difference.

2 What is there that will prevent it from cementing?

A If you would take Portland Cement - take 5 or 6 per cent of that and mix it with earth, it does not make cement. It is inert.

But when you bring it in connection with the necessary proportion of sand and so forth, it then makes a cement. The conditions are not alike. It is not a

For comparison. There are no features that are alike. There are no physical conditions nor chemical features that are alike in the parallel case & which you are trying to draw.

Q Do all kinds of earth contain that which prevents cementing? A No sir.

Q Well, what kind of earth does contain that property which will prevent the cementing process you speak of? A I do not know that there is anything in the earth, in and of itself, per se, that will prevent cementation except the diffusion.

Q And that is all?

A Yes, certainly.

Q Now I understand you to admit at this time, that if this blue cement disintegrated, were put upon the soil to the extent of 2 feet deep, all between

The Cultivated Portion and the Coh of the Soil. would Cement? A Noen; I do not mean anything of the kind.

I yn said a while ago that it would cement if it was not Cultivated?

A Noen; it would have to receive the other ingredients necessary to help make Cement.

2 If it received the water from the heavens and the water from the drainage and if that Evaporated - if the water Evaporated, it would leave the cementing properties in the soil?

A The water from the heavens as you call it, would not add any ingredient to help make the cementation.

2 What is the difference between the water from the heavens and the water from the North Fork of the American River?

A. The difference between them is that one contains no inorganic constituents, and the water of the American River contains all the way from 3 to 5 grains to the gallon of solid constituents, of soluble constituents in the form of soda, potash, lime and silica.

2. Does the Cement - the blue Cement contain cementing properties in itself or are they contained in the water?

A. The blue cement itself contains most of the properties that are necessary to form cement with the addition of those ingredients added to it by the water.

2. Now I understand you to testify if you could take that blue gravel and pulverize it and thoroughly saturate it with the water of the North Fork of the American River and allow it to remain for a considerable

length of time and then allow the water to Evaporate that it will form cement, but that if you take that same dissipated Blue Cement and thoroughly saturate it with rain water and allow it to remain for the same length of time and then allow the same process of Evaporation, it will not form cement?

A No Sir, that is not my Explanation of it.

Q Is not that your testimony at this time?

A No Sir, it is not my testimony.

Q Do you swear that that is true or untrue?

A It is untrue in the mode that you state it.

Q Did you not testify a moment ago that the water from heaven did not contain the properties necessary to ~~cause~~ ^{form} the cement and produce that result from Saturation and Evaporation

A Yes.

Q Yn testified to that?

A Yes.

Q So that rain water saturating this and then evaporating will not form cement while the water of the North Fork of the American River, saturating it and then evaporating, will form cement?

A Under certain conditions

Q I am not asking you about certain conditions?

A If you will allow me, I will explain just exactly what it is. You are going off on a theory of your own

Q That is what I propose to do. You are going off on your theory?

A I will state to you a fact that can not be denied. You can deny it if you wish with the chemical laws, I am not stating a theory here. I am stating what is an absolute fact, which is capable of a correct

demonstration - a correct and mathematical formulae.

Q Where does the water of the North Fork of the American River receive its mineral properties? A It receives them by the power that the water has to dissolve from the soil and rocks the constituents of them.

Q Does it not receive a large proportion of the mineral property from the blue cement and other material through which it passes in the mountains? A Yes, certainly it does.

Q Originally it was rain water.

A Yes, and originally sea water.

Q Now then, the rain water in contact with this material containing these mineral properties, will acquire the same properties that the water of the North Fork of the American River contains?

A Yes.

Q. Then why is that the water after it has these properties does not contain the same cementing power and does not aid or give the same aid to the cementing power of this material, that is given by the water of the North Fork of the American River? A. Of course, if rain water is allowed to come in contact with ingredients which are soluble it will dissolve them, but when the rain water falls from the heaven on this material it has no opportunity to abstract anything from the rocks.

Q. This material, not the rocks. This material gives the mineral property to the rivers? A. No sir, not at all, because the blue cement does not form the 1/100 part of the great rock range of the Sierra Nevada Mountains. Up

near Silver Lake there is a cha-
 ly beate Spring putting forth
 there containing 9 or 10 grains
 of salts of iron in solution.
 Elsewhere up near Shasta
 there is a Spring containing
 a large quantity of Carbonic
 Acid gas. That tumbles over
 the rocks and dissolves them
 and acts as a menstruum.
 Of course originally the water
 coming from the heavens was
 pure, but it percolates by
 going through the rocks, and
 takes up whatever is soluble
 in them.

2 Does any of the water, or any
 great proportion of the water in the
 North Fork of the American River,
 have any greater opportunity to
 dissolve the mineral properties
 of the mountains, than water
 which would be thrown in contact
 with this material and allowed to
 percolate through it and remain in it,
 until Evaporated? a No, in
 proportion as the material is porous, it offers
 a large surface to the water passing through the
 gravel and it will take up a much larger proportion of it.

Q <ent'y> But I will ask you if it will not take a larger proportion —

A <ent'y> Let me finish my answer

Q One moment now. I gave up to you a moment ago. I ask you whether it will not take up a larger proportion in proportion to the amount of water, under the circumstances spoken of by me, than is received by the waters of the American river passing down simply through its banks, through the banks of that river and the sides of those mountains?

Ans

Q It will not?

Ans. for the reason that at the headwaters of the North fork of the American river there are quite a number of

these springs containing soda and silica and carbonic acid flowing down there in large quantities. That comes over what? It passes over a belt of lime I believe to be there. All these rocks serpentine rocks contain lime and it dissolves. There is where it receives most of this material. It receives some from this but it is so small when related to the way the water percolates all through the rocks -

Quint's? I will ask you if the blue cement does not contain all of the cementing powers and cementing qualities that can be found in the waters of the North fork of the American river? ^{clays}

Q I will ask you

10766
whether or not the blue
cement does not contain
sufficient of those proper-
ties to cement itself
without the aid of the
waters of the North fork
of the American river?

Also a certain extent
these other things aid it,
accelerate the cementing
process

Q Now then if they con-
tain these properties
in sufficient quantity
to contain within them-
selves the cementing
power, why is it that
they need the aid of
the waters of the North
fork of the American
river and not the
aid of pure water?

A I said it would
re cement itself without
the aid of any other
subts but that this
material coming down
accelerated the operation

It accelerates it

Q It accelerates it?

Answers certainly

Q How much of the cementing property in proportion is added by the waters of the American river? A I have made no quantitative ~~meas~~ estimate. I simply tell you considerable, from the well known laws of Chemistry.

Q In proportion how much of those mineral properties are contained in the water? In proportion to the amount contained in the blue cement? how many grains to the gallon?

A I do not understand your question

Q I say taking those two things, taking a gallon of this blue cement and a gallon of the water of the

North fork of the American river, how many grains in the gallon, to each of those gallons, of these mineral properties which you say contain the cementing power, would be found in each one of those in proportion.

A That is a very peculiar question.

Q Well I will ask you then whether or not these cementing properties are not in the blue cement in the proportion of 999 to 1 in the water?

A They are

Q And more than that? A million to one I will put it?

A I do not think you understand it. I can not understand and you really. I will try —

Q Sorry? One moment

Q. ^{out} One moment. You do not understand me and I intend that you shall. You say that this water contains certain elements which aid the power of the blue cement when dis-integrated. I ask you whether or not those properties which you say are in this water and which contain the cementing power are not less than one million as much in proportion as is found in the blue cement itself?

A. They bear no relation to each other at all and are not the subject of a comparison.

Q. If they contain the same properties they are the subject of a comparison in quantity are they not?

A. No. They are not the

subject of comparison in any respect

Q Well why?

A Why?

Q Yes why are they not the subject of comparison in quantity if they are the same kind and you said they were?

A Because in the first place one is a liquid and the other is a solid and when you take a dry solid it needs the addition of water to it before it will make a cement. If that water contains certain elements that will accelerate the cementation so much the better.

Now here we have got this material, that is a cement, self evidently a cement because it is cemented. The water from the American

river contains only about an average of 6 grains altogether to the gallon. That gallon of water must evaporate before it will leave the solid material in a finely divided state to make the cement.

Q What do you say this cementing material is contained in the water?

A Silica and the soda. Silicate of soda is the great —

Q And? What do you say is the cementing power in the blue cement?

A Silica and alumina.

Q How would you extract the silica from the water?

A That involves a detailed description of chemical analysis.

Q You would do it by chemical analysis?
A Yes.

Now then, how would you extract it from the blue cement?

A By chemical analysis
Q After having extracted it what proportion in a gallon, in your judgment would you find of silica in the water, or how much silica would you find in a gallon of water in proportion to the amount found in a gallon of this blue cement?

A A gallon of water will contain probably about $1\frac{1}{2}$ grains of silica. It is a peculiar way to put it to a chemist - a gallon of cement. We generally take it by weight. But we will assume that a gallon of that would weigh somewhere about - I will tell you in a moment. A gallon of water we will say weighs 10 pounds, we will take the imperial

gallon, the American gallon weighs less, so we will take the Imperial gallon which weighs 10 pounds. That cement has about $2\frac{1}{2}$ specific gravity; consequently it would weigh about 30 pounds and that would contain on an average about 75 to 80 per cent of silica.

Or what would you say, then was the proportion, putting it in grains; the water containing $1\frac{1}{2}$ grains to the gallon?

Anyon can figure that or if you will give me a black board I will. I am not good at mental arithmetic.

Or make a rough estimate?

A shall not. You have the figures for it. It contains 90 per cent and weighs 30 pounds.

Multiply 90 by 30. I will help you out. I thought

You were a good mathematician

Q I am not making the calculation myself. You can multiply it yourself

A 30 pounds and 90 per cent. That would be 27 pounds of silica

Mr W C Becher If Counsel desires any figure I ask that the witness should have paper to make the figures

Mr Hart Now I want you to state to me how much $1\frac{1}{2}$ grains of silica would accelerate the cementing properties of a gallon of blue cement, containing 27 pounds of the same kind of cementing material

A A very considerable amount

Q It would accelerate it very much $1\frac{1}{2}$ grains would?

A Yes

Q What do you say -
About? One moment!

If you will, please listen
 to me now. When the
 sand is here, the silica
 which you have taken —
 silicate of alumina I
 suppose you mean — you
 do not mean silica; so
 I take it for granted you
 gave me that — when you
 have a trifling per cent of
 the silica in a state
 of solution it permeates
 through the whole and
 in the consolidation it
 forms the cementing material.
 It has no relation at all
 to the proportions of the
 silica in the water and
 the silica in the dry
 sand. As an illus-
 tration take the method
 that Ransome has for
 making artificial stone,
 and that is the best
 illustration of all, of it.
 You can ^{take} sand and you
 can take a few per centages
 — five per cent I believe

of silicic acid and it will make a hard, solid rock. Why not add five per cent of silica free? For the simple reason that it would not do it. It must have the silica in a state of solution. And there is where the whole secret is. I cannot explain why; that is a power I cannot investigate.

Q. I have made this calculation: there is $1\frac{1}{2}$ grains to the gallon you say of silica in that water and there is 189,000 grains in one gallon of the sand of blue cement. I will ask you whether or not the water permeating or percolating through this blue cement would not take up more than one and a half grains of that silica

in solution?

A From where, from the blue cement?

Q From the blue cement

A It would take some of it and deposit some of it, take it up and deposit it

Q Now I ask you why it is that $1\frac{1}{2}$ grains in solution is so much better - that is when the water enters it - than $1\frac{1}{2}$ grains in solution made by the percolation of the water ~~made~~ in the sand?

A That is a higher law that I cannot investigate

Q You say it is a fact? A one moment -

Q Isn't? You say it is a fact? A one moment -

Q Isn't? I will not wait one moment, I am examining you

A I will answer your

question

Q. You say you cannot explain it and I ask you if you say it is a fact?

A. I want to explain it
Mr. Belcher The witness started to make an explanation and I think he should be permitted to do so.

Mr. Hart This is the only case I ever had to do with in all my life in which the witness bossed and conducted the examination.

Mr. Belcher The Court directs the examination.

Mr. Hart of course but the witness is ~~min~~ trying to tell us how well shall conduct our examination.

The Court I think not.

Mr. Hart She is constantly telling me what I shall do.

The Court The Witness
has a right in any case
I ever heard of to complete
his answer

Mr Start What is his answer
to my last question?
<The Reporter read the
question>

I submit that is a
complete answer to my
question

Mr Belcher Is your answer
complete
A No

The Court Then let us
have it

A As near as I can
explain why five per
cent of silica in the
state of silicic acid,
in solution - will cement
95 per cent of sand to
solid rock, we know
that it will do it; it is
a fact

Mr Start That is about
as much an answer
to my question as if

you had told me the
conversation going on in
the moon

Alwell I am sorry you
do not understand
chemistry; that is not
my fault

& I did not ask you
that question

As you have been leading
me here through some
of the most complicated
questions in chemistry
that need a chemist to
understand them and
my answers. That is the
trouble. I am sorry to
have been obliged to
enter on any controversy
with you because you
have been asking me
questions -

& (urty) I do not want
any lecture from you. I
think I have sufficient
intelligence to understand
you with all your
transcendent learning.

I do not want you to give me comprehension

Now you say that this mine there is composed of two kinds of material?
 @ What mine?

@ The gold Run mine
 A two kinds of material
 O yes the upper and lower strata.

Yes

@ What is the color of that material?

@ The upper stratum is a kind of a brownish yellow, is more yellow than the other I believe this is the upper, and that is the lower <showing> that is a little more highly colored

@ Which is the upper?

A I should think that is the upper <showing>

@ Which is the lower?

A That is the intermediate and that is the lower <showing>

Q How much is there of the lower stratum?

A I just looked at it when there and would judge it from observation to be about 120 feet

Q Do you testify that the blue cement in that mine is 120 feet thick?

A Of the cemented material there is 120 feet there

Q I speak now of the blue cement, this that you see here?

A About 60 feet and then on that is 60 feet more of a material that is not quite so blue

Q How much of that material in that mine is like Sample found No. 1?

A I should think there was about 60 feet of it

Q All around the mine?

A I only looked. I went

down into the cut and
saw the face where it
was opened.

Q Are they working that
a They were not working
when I was there.

Q Are they working it
or have they been working
it? A They have
been working it. They
had a pit there.

Q Do you know there
is not over 20 or 30 feet
of that material in
that mine?

A No I do not.

Q Do you swear there
is over that?

A I say there is there
of cemented gravel 120
feet.

Q I ask you whether
there is in that mine
more than an average of
30 feet of that material
that you see lying there?

A I do not know. I see
no difference between that

and some 60 feet in depth of gravel which is similar in character to that kind of gravel that I have met elsewhere

O I ask you now whether or not that blue cement which you see lying there - sample found No. 1, is not but a very small proportion next to the bed rock, which is covered with a yellow, lighter cement which is nearly the color of a postal card running from a point about 30 feet from the bed rock up 100 feet to the top of the rim now being washed?

As yet we have the section of the cut which was made by Wren. I had it in my hand when I examined it. Then I will be able to answer your question

fully.

Q I suppose you gave that such an examination as a chemist will ordinarily give material of that kind?

A No I did not go there to make an analysis of the hill. I went there and spent a few hours only there to see the general character of the material.

<The Wren cross section is given the witness>

I will say that I did not notice that there was any particular difference, in the depth of 50 or 60 feet across the section here where I looked at it, and that material.

Q I ask you whether or not the large proportion of that material from a point about 30 feet over the bed rock

is not of a yellowish postal
card color. And

Q Susceptible of easy
disintegration, which
when subjected to the
air so as to become
slaked, forms that
sample found No. 2?

A Not at all. I am
speaking now with
reference to the very
centre of the channel
here. Of course if you
go up there you will
find that the light
material presses on
the bed rock near the
rim. Of course if you
go there you will get
an illustration to
show that that yellow
is within 30 feet of
the bed rock, but I
am speaking now of
the very centre.

Q I speak generally,
of any point.
A I am taking the

very centre, the very
centre of what is called
the blue lead channel

Q I was taking it as an
average whether it is not
from 10 to 31 feet deep from
the bed rock up to the top of
this blue gravel proper?

A No. It is not. It is 60
feet at least.

Q I will ask you to state to
me whether or not this pic-
ture is not a correct repre-
sentation of that bank
(showing cutters photograph marked
Jodd #1)?

A I was not up there. Is
that the bed rock (pointing)?

Q No. That is the foreground.
These are the rocks not bigger
than a man's head.

A I do not recognize it?

Q I am going to examine
you about this?

Mr Belcher We object that
it is not in proper examination

Mr Hart. I am examining the
cutters as to the nature

of this bank, and I have
a right to use any illustra-
tion I desire to, if it is
an illustration

Witness I am to say that
this is not a correct repre-
sentation as regards the
character of the gravel.

I ask you whether or
not that little corner there
does not represent the
blue gravel, and this En-
tire embankment here rep-
resent material of this kind
(sample goes to 7?)

What is the view?

Mr Hunt. What is the view,
Mr Allard?

Mr Allard. Front view

Witness I do not know
whether looking east or west
or north or south. I do not
know whether that is a rep-
resentation looking up, or
whether that is a represen-
tation looking against the
bank.

Mr Hunt It is looking north-

westwardly standing in the
 pit? A I can only
 say, if you wish it with
 reference to the position of the
 cut, then I will look at it,
 and understand

I I ask you ~~now~~ whether
 or not, standing in the
 pit and looking north west-
 only -

a [Duty] which is the cut?

I I do not know anything
 about the cut. I am stand-
 ing in the pit now and I
 want you to go there with
 me. A Here is the

cut (showing then cross section of

I I do not want that.
 I insist that you shall an-
 swer my questions. I am
 going to examine you about
 the bank.

Mr Belcher We object, that
 that picture can not be
 used in the cross examination
 of this witness for the reason,
 first, that the witness does
 not recognize it as a rep-

representation of the face of
 the claim that he drew;
 Second, that it is a matter
 of which the Court will
 take judicial cognizance,
 that a photograph of a bank
 is always out of proportion.
 It is distorted, it is in
 the very necessity of things
 that it must be distorted
 and hence can not be a fair
 representation; while the
 cross section which he has
 now, drawn with instru-
 ments, represents fairly
 and absolutely the condition
 of the cut.

Mr Hart. I am cross ex-
 amining this witness as to
 whether or not the material
 is of the kind that he
 says it is, and I present
 to him a picture representing
 the Embankment.

The Court. When shown the
 witness, if he does not
 recognize it, that ends it
 of course.

Mr Belcher And he says
he does not.

Mr Hart. I do not ask
him about that, but whether
or not this does not correct-
ly represent the sides of
that bank. If he swears no,
that is all right; if he
swears yes, that is all
right. I am not asking
him to identify the repre-
sentation contained in the
picture.

The Court. He says he does
not recognize it, as I un-
derstand. You can ask him
that question however.

Mr Belcher I understand,
that he already has stated,
that he does not recognize
it at all.

Mr Hart. Now you are stand-
ing in the pit looking north-
westerly toward Gold Run
when you look at this picture.
I will explain it to you.
This is the foreground where
the instrument is by way

This is a man on the top of the bank, and that is a tape line which is 1 foot in width and divided into spaces of 1 foot, each black and white, so as to show the comparative size of the rocks contained in the bank. I will ask you now whether or not —

Q {Intj} Give me a little at a time; I can not remember it otherwise

A I am giving you the position simply; I am not asking you anything. Mr Belcher. We make the objection that the witness must be asked if he recognizes that, and that it is not necessary or proper that it should be described to him, to know whether he recognizes it. I do not think that is necessary to determine whether a witness can recognize it or not. If a picture needs to have

written under it "This is a horse" Before any body can tell whether it is or not, we submit that it is not a very proper thing to come in here in Evidence

Mr. Hunt, Mr. Belcher seems to think I am trying to identify this picture. I am merely cross examining this witness as to the Character of the material in this book, and I simply use an illustration and ask him whether the material is like it or not. Mr. Belcher And in order to get the picture before him, you have to tell him "This is a horse"

The Court. If the witness does not recognize it, there is no use in Counsel assuming it to be so.

Mr. Hunt. I am going to cross examine as to the Character of the material and not as to the correctness of this picture.

Mr Belcher Then we say the picture shoud not be used unless the witness recognizes it as a representation of the claim

The Court. If he does not recognize it, it is not before him

Mr Hart. I am going to show it to him in this way.

Now I ask you, standing in the position that I mentioned, if the bank is not composed of blue material as here represented, a clear line showing the distinction between the blue and the yellow material, the blue material being only a little dark spot, and the balance of that entire bank yellow, presenting the appearance you see there.

Mr Belcher Now we object to that

Mr Hart. Do you swear positively that that is not the kind of material in the

bank and that, that is not
a correct picture of the
bank?

Mr Belcher Now the objec-
tion is that he can not
be examined in reference to
that picture further than
this: First, that being shown
him, and asking him if
he recognizes it as a repre-
sentation; if he says he does
then he may be examined in ref-
erence to the picture, but
if he does not, then he may
not be further examined

The Court. I suppose Counsel
is going into this to see if
the witness does understand
it

Mr Hart. I may take a
piece of material as that
box and show it to the
witness and ask him, "

Is not that the same kind
of material that you found"

The Court Of course.

Mr Hart. And I may take
this picture and do the

same thing.

Do you swear that that is not a correct picture of that bank?

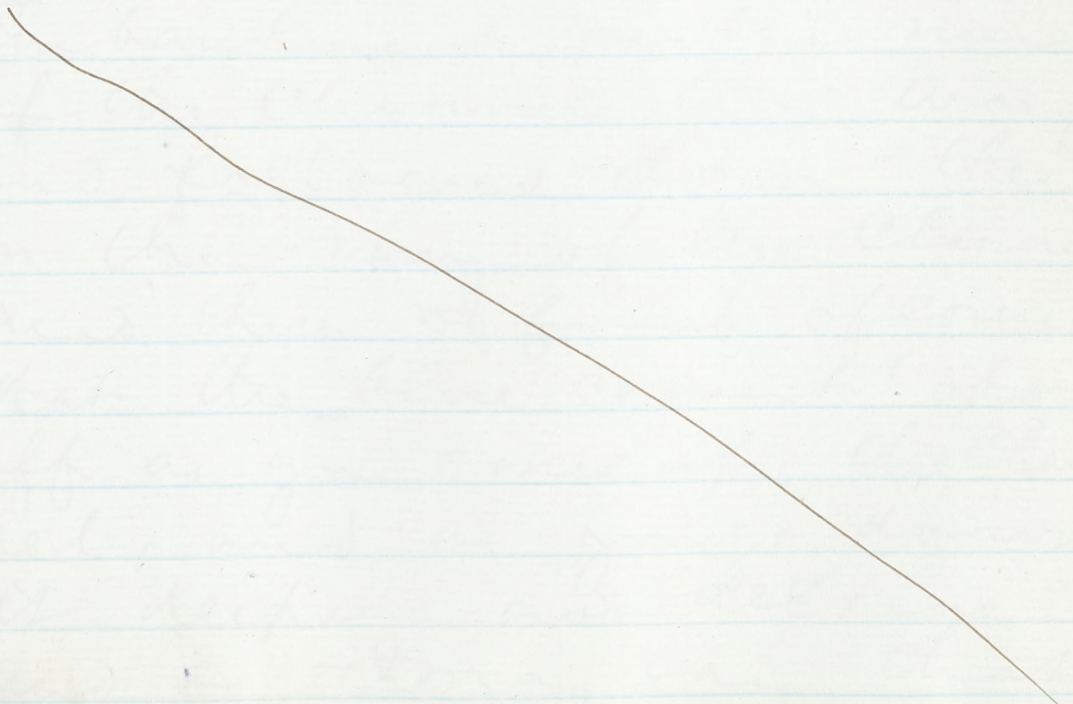
A I do not know. I do recognize any such a view. It may be, but I did not see it; I did see any such view.

Q. Did you ever stand in the pit at the point I mentioned to you?

A. What point?

Q. In the pit, down in the pit, and looking in a north - westerly direction towards Echo Run?

A. I did



Q Did you look at it closely for the purpose of determining the character of the material and the nature of the bank?

A No sir.

Q You did not?

A I went and examined the material and character of the material in the cut.

Q Down below?

A Down below.

Q Did you examine the nature of the material above the cut?

A I did as I was walking along from Gold Run

Q Did you examine it?

A I went down on the Embankment on the rim of the channel this way, and followed down there on the rim of the channel and then I found of course that the blue cement tapers off as you come up the channel, and as you go down it deepens and deepens and so I may say that

The photograph may only have embraced a small portion, showing a wedge of the blue cement, and not the whole, and judging from that picture I should say that that is what it does represent.

How long were you in that pit? A I do not think I was there over an hour.

I will ask you whether or not, looking to the north west that little black spot, does not represent all the blue cement?

A No sir

I listen to me a moment - like this. Not that can be found in that mine, except that portion which is found on the rim of the mine running toward Canon Creek.

A All I can say is, that I did not see any boulders as you have got it there with the blue

Cement. I found there 120 feet of cemented material, 60 feet of the bottom of which is very hard and corresponds with that right in the center of the pit. Of course that thins out as you come up the rim - that is always the case.

2 And of a yellowish nature? A No, you do not come to the yellowish nature until 120 feet from a perpendicular line, drawn from the center of that pit.

I do not think this picture here correctly represents comparatively with that tape line the size of the rock that may be seen in that embankment?

A Yes, I would say that that is a pretty fair photograph representing the general character of these deep gravel deposits and if it ever shown me

Without having known that it has anything at all to do with the Gold Run I never say yes it came from anywhere - from Shasta County or anywhere.

2. I speak of the gravel here? A well, there is no difference in the gravel there. There are 400 miles of channels and the gravel is precisely the same, there is not a bit of difference, I do not know any difference.

2. Now there is not one stone in 900000 in that bank that is a foot high is there? A I do not know, Sir.

2. The great majority of the stones and rocks are of a small pebbly character?

A In the upper gravel, that is the case, but when you go down to the bottom gravel then it is different.

2. When you speak of the

upper gravel, do you speak
of the upper gravel in the
present workings of the
Gold Run?

A Sam speaking of the
gravel they have already
denuded, and washed away
and when you are looking
at the pit to the left you
see banks of gravel and
fine clay, but towards
Canin Creek the mine has
been denuded and degraded
down and there is not so
much of it.

I ask you whether or
not, that tape line run-
ning down that bank does
not represent correctly the
size of the rocks contained
in the present workings of the
Gold Run mine, as compared
with those small foot square
pieces of canvas.

Mr Belcher I object to that,
he may not be examined
with reference to the flat
cubes, he recognizes it as

A representation
 Mr Hart. He says it does
 represent it fairly.
 The witness. I will tell you
 one thing here, it is easy
 enough for any one to distort
 that and make a picture
 with the camera, much
 nearer at the portion and
 the upper portion they may
 take on a larger scale and
 re-photograph it, so as
 to misrepresent. I have
 seen it done.

The Court. If he does not
 recognise the picture, that
 is enough.

Mr Hart. I am simply
 examining him, as to whether
 the bank is like this bank,
 whether the stones are small
 like the stones in this bank,
 that is all. I might bring
 a piece of the bank here
 and put it before him
 and say, "is not that
 like the bank here?"
 And it would bring a very

void picture to your Honor's mind, but I bring here now a copy, the picture of the material, which I propose to prove by this witness, he, not knowing that it is the same, but in fact it is the same - I propose to prove by him that the material which he has been testifying as being so heavy is like the material which is photographed on that card.

The Court. Ask him if he recognizes anything in that photograph as correctly representing that mine?

Mr Hunt. I asked him if the material is like that material.

The Court. Ask him that.

Mr Hunt. I ask them whether or not these rocks, taking a tape line and running it down the side of the bank like that, whether or not the comparative size of the

rocks in that mine, with the
Cape line a foot wide and
showing the foot square piece
there, would be the same as
there, I mean as compared
to these pieces of canvas a
foot square.

The Court. If he recognises
it he can say.

Mr Belcher Ask him the
question if he recognises
it.

The Court. Do you recognise
the comparison

Mr Belcher Not necessarily
the whole comparison

Mr Hart. You said a moment
ago that sometimes they
made pictures to deceive;
now putting a Cape line
which is cut up into sections
a foot square like that—

Mr Belcher Is there any
evidence that it is a foot
square

Mr Hart. We are assuming
that it is for the purpose
of making the estimates

Mr Belcher If you bring down gravel from the bank it will show for its self. It is a simple matter to put a Camera up against a bank that is 100 feet high and it is perfectly plain that one part of it will be very largely distorted, and hence we say that such a picture cannot be a fair representation anywhere.

Mr Hart I am going to prove that it cannot be otherwise. It is not necessary to make an argument here.

Mr Belcher A picture of this kind presented to the witness. If he recognizes it as a fair representation then he may be examined as to it and until he does he ought not to be.

Mr Hart Well I want to find out if he does recognize it as a fair representation; that is what

I am examining him about
 The Court I do not think
 there is any point in ask-
 ing the witness about what
 the Camera would represent.
 If he recognizes that material
 there let him say so
 Mr Hart He says that the
 Camera may be made to
 deceive

The Court It is immaterial
 whether the Camera is correct
 or not. The question is whether
 he recognizes that as correct
 or not.

Mr Hart I want to ask him
 whether or not a Camera
 could be made to deceive
 and make him improper
 comparison of size where a
 tape line was hung right
 down over the bank next
 to the rocks and bank.

The Court That is immaterial
 it makes no difference what
 he thinks about, if he
 recognizes that as a correct
 representation of the bank

let him say so

Mr Hart Commencing from this point here does or does not that give you a fair representation of the Character of this deposit which you call the blue gravel deposit, the present workings of the mines
 A No Sir it does not convey to my mind what I saw there.

Q In so far as the size and weight of the material is concerned?

A I do not know the only thing I can say if I wished to show that that represents the height of the bank I would find out what is the height of that man there and the height of that man there [Referring], and I would simply gauge it and see. It only represents to me as I told you before a gravel bank. I do not recognize any feature in it or anything that impressed its self on

my memory when I made the examination.

Q Assuming that these little marks here are a foot square and taking the size of the rock in the bank as compared with those little marks. A Well I suppose it would.

Q It would be a fair representation?

A If the Photographer has taken his picture correctly.

Q Well I am asking you about what you remember

A I do not recognize it there. I say it represents that the rocks are of different sizes.

Q None of them a foot square?

A None of them a foot square?

Q Do you see any of them a foot square assuming that that is a foot square?

A I do not know

Q This down here is no part of the bank, that is the bank, this is near the

Camera some small rocks there ?

A The Camera deceives — I do not say anything about it — I do not recognize anything about it

Q This is where the gravel is that we are taking the picture of — this is up against the gravel bank ?

A Show me the rock that you wish to compare with

Q I want to take the general bank there

A Well I do not see the rocks at all. I suppose if I had a good powerful microscope I would be able to see the rock.

Q There is one of the largest and there is another one (referring). Do you see a rock in that bank that is a foot square assuming that these things are a foot square.

A In the bank you only see the points of the rocks

getting out. You don't see the big rocks. When the material is blasted out and laying loose then you see the big rocks. Of course the face of the bank you only see it as you do in number one, here is an illustration of it (Referring) You see only a little bit but look at the size of the rock when you break it open. Here it would stand in the bank so, but that does not fairly represent the size of the rock by any means.

Q Would not the photograph tell you about the size of the rock that there is in it there?

A It would show that size only, just that little point. Here is a rock (Cobble) this would be embedded in this shape.

Q Don't you know that there is one of the largest rocks that you can find in that bank?

A No sir

The Court I do not see any point in asking him about the photograph. If he remembers it all right.

Q I am not asking him about that but I am asking whether or not that does give a fair representation of the material that he saw there?

The Court If he remembers it and can give you the benefit of his memory

Mr Hart He said first he did and then that he did not. I do not know now what he did say

The Court We do not care particularly for his views of what the photograph will do; if his memory does not serve him it will not help us any

Mr Hart You say there are 60 feet of blue gravel proper in the mine extending clear around the mine - You need not look at that - I do not

want Mr Urines testimony
it is yours?

A Well I took this picture
in my hand and my investigation
was made with reference
to this and I checked it by
stepping it so that I would
be able to testify.

Q I ask you now whether
or not there is 60 feet of
this blue Cement Number
one that extends clear
around that mine?

A Yes sir (Referring)

Q I do not want your
picture, I want your memory?

A About 300 feet in width
there 60 feet above the blue
Cement

Q 300 feet in width

A Yes sir

Q Where is that

A In the pit

Q Where in the pit - what
part of the pit?

A In the Centre of the pit

Q Does it run right up that
Channel of this ridge?

A Yes sir facing up into the Channel.

Q Facing up into the Channel?

A Going Towards Gold Run, going in the Channel.

Q You say that going up towards Gold Run there is 60 feet of solid Cement like that?

A Blue Cement.

Q Blue Cement from the bed rock?

A Yes sir.

Q Sixty feet and the balance of it is what?

A There is 60 feet of it here that is not so blue but very similar in character and then comes 75 to 100 feet of the kind of material that is in these other boxes.

Q Then you swear positively that standing in that place looking towards Gold Run up the Channel this bank of a yellowish character and this little corner of the blue

Cement proper here would
not be a fair representation
A No Sir.

Q It would not be?

A No Sir.

Q Well will you swear to
that positively?

A I do not know anything
about it.

Mr Belcher I object to any
further examination of that
plan. I have made the ob-
jection before and I think the
Court has ruled as regards
to it.

The Court I think he has
shown that he does not
recognize it.

Mr Starr I am not asking
him about recognizing it.
I ask him if that would
not be a fair proportion
as represented there of the
blue Cement. He swore
positively that it would
not be. How far up into the
mine from the bed rock do
you have to go before the

Material becomes of such Character as that it is easily disintegrated?

A About a little over 100 feet

Q One hundred feet

A I believe it is 100 to 120 it will vary of course on the rim, in some places you will have to go 30 or 40, but in taking it right in the Centre of the Cur you have got from 60 to 120

Q How far up is the Material of such Character as that you have to break it with a sledge?

A About 100 feet

Q 100 feet - all of it with a sledge?

A A good deal of it, not all of it because you will put in powder and after you had blasted it by powder and that which the powder has not broken up small enough in size to get into the flume you have to use sledge hammers to

break it smaller

Q How much of the Material in the upper portion after you get up ten feet from the bed rock do you have to break with a sledge hammer?

A I could not say, that will vary the blue gravel Channel is not uniform in hardness in that respect by any means.

Q So you have to break one yard in 5000?

A With sledges - yes sir a great deal more.

Q How much?

A I cannot tell you that how much.

Q One yard in 500?

A It varies Considerably - yes sir a great deal more.

Q More than one yard in 50?

A Yes sir I can only give you there my experience on the blue Tent mine.

Q That is not the Gold Run?

A That is the only personal experience I have had as to

that I have not been there in the Gold Run when they were running.

Q How long were you in the Gold Run?

A About an hour in the car just looked at the general character of the material.

Q And in a hour you saw sufficiently to be able to come here and testify as to the character of that material?

A Certainly that is not the only experience I have in those kind of mines. I know all the deep gravel mines in the country nearly, I have had continual charge of one which is almost identical in character and I know what we are doing there. Some places we have to put in a large number of men and some places do not require so many where the powder pulverizes it better. As to how many cubic yards has to be broken it is impossible

for me to answer.

Q Is there one Cubic Yard in co that must be broken by the sledge hammer process in this mine?

A I do not know what this mine is I would judge that that is somewhere about is judging from what I know being done elsewhere.

Q One yard in co?

A sometimes yes sir, and sometimes they have got to go and rebloss what they have got down, they put holes in it to break the chunks and break it up

Q As I understand you now the mine is composed of such material as that, it is of uniform color from the bottom bed rock up to the top rim of these present washings?

A The blue gravel, the Cemented gravel as it is called near the bed rock it is probably of a more

dark blueish color than it is a few feet above; 60 feet up it is not quite so blue and it continues to be less and less blue until you come up to that portion where it ceased to be cemented and then it partakes of the character of the material that is in these two boxes here.

Q Where do you find the material in the box number two?

A I should think that rests about 120 feet from the bed rock.

Q Where do you find the material in box number three?

A That is the upper material 10 or 15 or 20 feet

Q And the balance, all this is a fair specimen of the balance?

A Yes Sir I suppose so. I might go in the bank and blast out something quite

different it has the general Character - there is no perfect uniformity, the Character of the gravel depends to ^{very} a great extent upon the Character of the bed rock or trough in which the River was running. If it is of a dark blue slate then it is of a dark bluish color. If it is running through Talrose or Horn blende slate which are of a lighter color then the cement will be a lighter color; it is the bed rock, the trough in which the old River ran, that gives to a great extent the characteristic color of the gravel and consequently it must vary according to the formation through which it has travelled.

Q Now this is your opinion?

A Facts

Q This is your opinion as an expert as to what must be the formation and Character

of this material ?

A I say as to the general Color

Q I ask you if that specimen Number one is not a fair Specimen of the first 120 feet in that mine exhibit Number one ?

A Yes sir that is a fair representation as to hardness and general Character and Color

Q And an average of the first 120 feet ?

A The first 30 feet I would say

Q Now I will ask you on the other hand if that is not taken immediately from the bed rock and the hardest piece that could be picked out of the mine by any possible means ?

A I do not know that it is

Q Do you know of any place in that mine where there is a harder piece of Cement than that is ?

A I have seen much harder
Cement.

○ In that mine

A In that mine. No but I
will tell you I did not
look at this mine so as
to be able to testify as to
the relative size color and
so forth of every little str-
atum of gravel. I looked at
it with a view of finding out
if it was similar in character
to the blue gravel channel
as found elsewhere in this
State and I know that this
gravel is no harder than
a large quantity of gravel
that we are working con-
tinuously at the Blue Tent
mine. We have some there
that is much harder than
is all I can say.

○ I will ask you whether
or not the stratum from
the bed rock where you
find that material there is
not a constant decrease of
the hardness of texture or

Solidity as you go up towards the top }

A Sometimes, It is Changeable
 sometimes the material on
 the bed rock is a little soft.
 Q In this mine I ask you
 is that not so?

A I do not know.

Q That is gradually from
 the bed rock until it gets
 to the top of the present
 workings grows softer and
 softer, or not?

A I did not go up the claim
 or bank with a view to be able
 to say whether it is softer or
 not but it seems to me
 from the abrupt way in which
 the bluff was standing it
 seemed to me to be very hard
 throughout.

Q If you did not investigate
 that how is it that you
 came here and swear to
 the character of that material
 so positively?

A For the reason that I
 found some of that material

lying there and scattered on the bed rock that had not been washed away and I know the character of the blue gravel deposits in my own particular mine and I saw no reason from anything I could see from any physical inspection I was able to make that this was different from the blue gravel in the other places.

Q You are testifying now as an expert as to whether it should be any harder or softer than it is in the blue tent mine are you not?

A Of course I must have my experience somewhere else, I think if I was born in that pit and knew nothing else but that, my testimony would not be much account. A man can use his comparisons and it is not necessary for me - if I see a block of granite I know the hardness of it and I know its characteristics

Q If you had been born there you would know more about this identical material and you would not have had to resort to so much reasoning in order to ascertain its texture would you. You say that you cannot from your own investigation of that material tell how hard or how soft any particular portion of that bank is?

A No only draw inferences from what I see before me. What I see is a representation of much more of the same kind that I saw there.

Q You were speaking yesterday of the grade of the sewers; the main objection that you found to the sewers of Sacramento was its grade was it not?

10754 A Yes sir the grade of the main drainage -

Q And that grade depends upon the topography of the Country?
A The outlet does.

Q And you say that in the absence of a sufficient grade they shined pump?
A Yes.

Q Do they pump? Altho?

Q The City of Sacramento?

A I do not know. I understand there was a pump there, beyond the Y. St. levee where they intended I believe - I do not know exactly where it is, where they intended to pump.

Q What is the grade in the City?
A The grade in the City here.

Q Of the Sewers?

A It varies of the City.

Q Of the Sewers?

A Yes. I do not know.

Q You do not know anything about it?

A No Sir, I only looked at the main drainage canal, the outlet of which comes of course from the grade of the

Sewer.

What ought to be the grade of sewer? A 2 feet to a mile

I are not these sewer more than that? A I do not know

I you said that the side sewer ought to have a lower grade than the main sewer?

A Some of them have a very small grade.

I have not any of them, a grade of at least 2 1/2 feet to the mile?

A I do not know, I did not go in to the sewer of the City, and I only noticed to see how they were constructed with reference to carrying water, and I examined the main Canal.

I Did you say that the sewers were wooden, yesterday?

A Some of the private sewers leading into the main sewer are wooden?

I How do you know?

A I saw them

Q Where? A I saw one back of Huntington, Hopkins & Co's store leading from the sewer to a cess pit and then again I have heard Mr Bassett testifying.

Q You are testifying to what Bassett says? A Yes as far as the construction of the sewers are concerned I am testifying to what he said.

Q You do not know whether the City Authorities are constructing sewers of brick or wood?

A Some of brick and some are of wood.

Q How do you know?

A I saw them.

Q Some of the main sewer?

A Yes.

Q Where? A Between R Street and Y. and the outlet at the other place there, the one that goes the other side of Y Street.

Q Do you know how many of the sewers are made of wood? A Most, I

do not know how many
are.

Q Do you know the proportion?
A No.

Q Do you know whether there
are more than 2 or 3 wooden
sewers in the City?

A Only just what I heard
Mr Bassett say, that there
were a large number of them.

Q The drainage of the City
depending on so slight a fall,
any obstruction of that fall,
would be a great and very
serious injury to its drainage
would it not?

A Certainly.

Re-direct examination
of
Thomas Price

Mr Belcher Proprietor Price
in speaking of the number
of inches used in the Colorado
County by the Colorado Water
Company, you gave 8000,
10000 and 10000. Now did

I understand you then to say
or did you mean to be un-
derstood to say that the
whole of this water was
used by the El Dorado Water
and Deep Gravel Mining Com-
pany for itself? A No.

2 Or is this hydraulic mine?

A The total water used by
the El Dorado Water and Deep
Gravel Mining Company is
77,000 acres for hydraulic.

The balance of the water
as I mentioned is used for
mining - working in the ravine
and placer mining scattered
through the country there.

2 You mean sold to others?

A Yes, for that purpose.

2 Sold by the Company to be
used by others?

A Yes, to be used by others.
77,000 acres is the total
quantity of water we use.
Mr. Cadwalader Does that
include irrigation?

A No, that is simply
the water used on the mines.

that we either own ourselves
or the mine that we work
on shares.

Mr Belcher A suggestion is
made in regard to irrigation.
How much is used for
irrigation? All we use
somewhere about. I will
refer to it — Have it exactly
here — there were used in
1879 for irrigating 21,000
acres. And in 1880 - 16,875.

I When you speak of the
number of acres you mean
the number of acres running
in 24 hours? A Yes, and
this year, 1881, I think it
was a little larger.

I State whether or not the
income received from the sales
of water for irrigation would
be sufficient to maintain the
ditch property.

Mr Hart. I object to that ques-
tion. It is irrelevant and
unnatural and not in re-ex-
amination.

10760 Mr Belcher I shall admit that

it was not in regard to any matter that was called out on cross-examination.

The Court. I do not see any object in that inquiry Mr Hart. I would like to ask you one more question.

In the upper washings - what were the upper washings composed of chemically?

A They were composed of very much the same kind of material only in a greater state of pulverization.

Q That was the only difference?

A No, the upper washings were composed largely of volcanic matter.

Q I mean the upper gravel, the top gravel.

A Yes, a good deal of it volcanic matter.

Q What is the difference chemically between the two?

A Chemically there comes to be but very little difference.

Q What difference if any, name the difference?

A They would be composed essentially of the same ingredients only varying in proportion. The volcanic matter is much richer in potash and soda than are the metamorphic slates and granite.

Q What would be the difference in the cementing power?

A There are some portions — Mr Belcher (Intj) We have just been met with an objection that the matters were not strictly in re direct examination of the matters gone into by the other side. I will make the objection that this is not cross-examination of any matter that I went into on re direct examination.

The Court. That is obviously so.

Mr Hart. There is but one question that I desire to ask.

The Court. Answer the question.

A If anything the material from which the lava is composed.

Mr Hart. I speak of its

Cementing power?

A I do not think there would be any particular difference.

" ———"

Testimony of James O'Brien

called for deft. Sworn

Mr. Dibble Where do you reside?
A At Smartsville,
Yuba County

Q How long have been in California?
A 28 years

Q Why did you come?

A I came to mine

Q What has been your occupation here?
A Mining

Q How long have you been engaged in mining?

A 28 years

Q What kind of mining have you been engaged in?

A River, bench bar and
bank mining.

I Where? A Yuba County
 I Describe the Yuba River
 Mining

Mr Cadevalader We do not
 regard that as material
 Mr Dibble I Describe the
 Yuba River mining

Mr Cadevalader I object to
 that. It is immaterial
 Mr Dibble It is material
The Court. The amount they
 wash into the Sacramento
 River?

Mr Dibble Yes.

The Court. It seems to me,
 that an examination on that
 subject should be very brief

Mr Dibble It will be brief
The Court. It certainly is not
 so material, as we have
 been over it

Mr Dibble Not on this branch.
 I pass from Eldorado into
 the Forest Still divide and
 I am now in another di-
 rection

The Court. I hope you will
 make it as brief as

possible

Mr Dibble I will

Reporter read question

A The river mining was carried on by building dams or first building flumes and cutting canals along the banks of the river to turn the water from the stream. They put in dams at the head of the flumes and one at the lower end and dump the water out of the river and work in the gravel, the gold bearing gravel in the bed

Q What was the depth of the gravel and sand in bed bar and banks of the Guba River

A From 5 to 40 feet deep

Q How extensive was the gravel and sand deposits in the bed and banks with reference to the width?

A From 100 to 500 feet wide

Q How extensive was this gravel and sand deposit in the Yuba in length?

A For a distance of 40 miles

Q Was this gravel and sand deposit in the Yuba river from mining or was it originally in the river?

A It was originally in the river. It was found there before any mining was done in the river.

Q When did Yuba River Mining of this immense amount substantially cease?

A In 1857

Q Why state the reason as the mining of the upper benches covered up the beds of the rivers and the mining claims in the beds of the rivers and on the bars

Q What effect has this material displaced in the river mining on the beds banks and bars with reference to the lower mining claims?

A It covered them up.
Q Why? A Well because it was a necessity and the universal custom there.

Q As to density state the character of the gravel found in the river from Marysville to Downieville?

A It was very dense and packed and solid.

Q Would floods move it? A No sir if floods would move it it would not have been there.

Q What did move it?

A Manual labor.

Q What other kind of mining was and has been done in that

section? A There were
placeries, gulch and
ravine mining.

Q What others?

A Deep gravel mining.

Q What do you mean
by deep gravel mining?

A In the old river
channels which we
find.

Q What do you mean
by gulch and placer
mining?

A Gulches and placers
were in the ravines
putting out from the
deep channels and the
gravel was deposited
in ravines and flats
adjacent to the old
channels.

Q In what manner
was gulch and placer
mining conducted?

A By the use of water.

Q What became of
the material washed
from those mines?

Q It was all run into the
rurnes and streams
and canons and it
found its way into the
river

Q In what manner was
deep gravel mining con-
ducted?

A Deep gravel mining
was conducted by the
use of water

Q Through what avenue
was the material dis-
charged? A Through
flumes and cuts and
ravines

Q Why so discharge

A Because it was the
only place it could be
discharged

Q What element of
power is used greatly
in all gold mining?
A Water

Q What is hydraulic
mining? A Hydraulic
mining is mining with
water under pressure

Q. How does the hydraulic pressure vary in the various kinds of mining?

A It varies in the difference of the pressure

When did deep gravel hydraulic mining commence in your locality?

A In 1853

Q Referring to pressure what effect if any has the use of water through iron pipes, monitors, hydraulic chiefs and little giants had on the carrying of material by water?

A None

Q Explain the advantages of the monitors hydraulic chiefs and little giants?

A The only advantages in the monitors little giants and chiefs is that you have control of the water. They do not ^{add} anything to the

carrying capacity of the water

Q Describe the Little Giant? A The Little Giant is a piece of machinery attached to an iron pipe and worked on a knuckle joint so that you can turn it to any point of the Compass without the water losing any of its force

Q You say that this class of hydraulic mining within your knowledge commenced in 1853?

A Yes

Q To the extent of your knowledge? A Yes

Q Can these deep gravel mines be worked to advantage by any other method except as you have stated?

A No sir

Q Describe the deep gravel mines on the

Yuba river watershed
Mr Badwalader I object
 to that. They have been
 described.

Mr Dibble They have not
 been described by any
 one at all.

Mr Badwalader They were
 described by Stamilton
 Smith.

Mr Dibble It will take
 but a minute.

Mr Badwalader They were
 described by Mr Stamilton
 Smith and by Judge
 Searles and by another
 witness who went to
 Moore's flat in 1856. I
 do not know his name.

Mr Dibble Go ahead
 these old channels
 run along pretty much
 at right angles with the
 present channels in some
 places and parallel
 with them in others
 the banks of gravel range
 from 20 to 250 feet in

depth

Q Describe the lower stratum of these mines as to density and movability compared with the upper material

A The uppered material there was a very light loam and there was considerable soil on top. Next to that was a stratum of fine cement or gravel and the lower or bottom stratum was very coarse and dense and cemented

Q When was this upper light material washed off? A It was washed off prior to 1875

Q How was this upper material moved?

A It was moved by water

Q Explain fully in reference to how it was moved by water?

The Court This will be

the same as we have been
over with other witnesses,
as to the manner of mining
Mr. Sibble I presume it is

Q What became of it?

A It was washed into
the river

Q How is this lower
dense heavy material
moved? A It is moved
by water

Q What besides water
and powder is required
in the working of the
deep gravel channels?

A Tunnels, flumes,
ditches, storage reservoirs
road ways, iron pipes
and mining appliances

Q Explain why they
are required?

A The tunnel is required
to get drainage and to
hold the flume to run
the gravel through. The
flume is required to
pan the gold. The
reservoirs are required.

to store the water and to have water during the dry season. Ditches are required to take the water from the reservoir to the mine. Road ways are required to get material to the mine to work it and pipes and appliances are required to work the mine. The pipes are required to carry the water.

Q In those Yuba drainage area mines state the length of tunnels.

Mr Sturt I object to that. They have been into it before and it is immaterial.

Mr Dibble No sir there has not been a word of it by any witness.

Mr Caldwell They were fully described by Stamilton Smith.

Mr Dibble It will take but a minute. The

testimony is perfectly proper unless the Court says it is not

The Court Answer the Question

A I should judge that there are 30 miles of tunnel and flumes on the watershed of the Yuba

Q Referring to the Yuba mines with which you have been connected what length of time has elapsed between development and profit? A It has been no time.

Q No time? What do you mean by stating no time?

Mr. Caldwell I object to that as irrelevant and calling for an unnecessary explanation

Mr. Tibble They have endeavoured to prove that by drainie mines were

unprofitable. I want to
 prove by this witness
 that by drainage mines
 have been profitable
 and have paid dividends
 <The question is read by
 the Reporter>

The Witness I mean that
 since the commencement
 of these mines there
 they have paid for
 labor and material and
 merchandize and have
 paid money to all
 industries connected
 with them and if there
 has been any loss at
 all it has been to the
 owners.

Mr Badwalader We will
 take it that way.

Mr Dibble They have
 paid a profit to all
 public industries?

Ayes

O State the population
 of the Yukon drainage
 area mining district

dependent on the mining industry?

A About 30 000

Q What has been the production of this Yukon drainage area in the mines?

Mr Leadwala I object to that question. It calls for a guess and is irrelevant.

Mr Dibble We have not referred to that section at all.

Mr Leadwala You have Mr Dibble You have not. The Court. I supposed when General Stark said that they would put in no evidence on that subject that you would put in no further evidence on it. I supposed that was the understanding.

Mr Dibble Then I presume it is conceded in this case that it is

over 1200 millions

The Court I do not know about that They said they would not put any evidence in on that subject

Mr Dibble & what amount remains to be won?

Mr Leadevalader I object to that. That is calling for a guess

The Court That, I understand was in the same condition

Mr Dibble & Did you observe the Yukon floods of 1861-2 and if so state the effect of those floods upon the early river and gravel workings?

A I did sir

What effect?

Well it washed large portions of them down into the lower rivers and the valley.

What effect on the previous mining displaced

material from the
Yuba Channel mines
did they have on the
navigability of the
Sacramento river?

A I do not think it
can have any bad
effect

Q What effect upon the
valleys and bars
and bays?

A I do not think it
can have any upon
the valley and bays.
The bars of the river
it will cover them up
in the upper rivers

Q I did not mean the
bars - I meant the
bays. State why
it could have no effect
on the navigability
of the rivers and
on the valleys and
bays

Answer The mining

to be done now on
the Yuba, in the
drainage of the Yuba
is a material that
is very hard and very
course and dense
when deposited in
the river by water
it would become com-
pact and solid there
so that water would not
move it

Q State your knowledge
of the Yuba floods
and overflows?

A At what time

Q Your knowledge at
any time?

A Well my knowledge
of the Yuba floods
and overflows is that
the Yubas have
overflowed the lands
along the Yuba and
below the foot hills
on both sides of the river four
or five times since I have been in the State

Q. In that respect what effect would the filling of the channels of the Feather and Sacramento Rivers to the depth of from five to ten feet with sediment have upon the height and width of the flood overflows of the Sacramento valley?
 A. I do not think it would have much effect for the simple reason that the bed of the River where the deposits are is very narrow and the amount of water that the small trough or basin of the River would hold would not add anything to the height of the water when the water is spread of an area of 15 or 20 miles wide. I do not think it would make the one sixteenth part of an inch difference in a high flood in elevation.

Q. State the Capacity of the Reservoirs on the Yuba drainage area?

10782 A. They have a capacity to

hold 18000 inches of water for five months in the year.

Q State the effect of these reservoirs on the winter floods.

A The effect is that the amount of water stored is kept out of the Rivers in times of high water.

Q To what extent would it lessen the floods?

A To the extent of the storage.

Q State the effect upon the navigability of the Rivers in the summer or dry seasons?

A It adds to the quantity of water in the River to the amount that it is stored in the winter.

Q What has been the effect of the deposit of dense material coming from the deep gravel mines upon in the River - the Yuba River.

A It has had the effect to build natural dams and obstructions to the water and to hold back the fine material

that was put in there from the placers and the lighter diggings in early days and the raising of the beds of the upper Rivers and reducing the grade of the River and destroying the velocity of the water.

Q Give an illustration?

A Well at Smartsville where I am tailing at Rose's bar. On the Yuba River, the tailings there is about 150 feet high. The River when I went there was about 350 wide. Now it is about 3000 feet wide and the water was a torrent in high water when I first went there. It went down in a perfect torrent and now the water comes down as smooth and the stream there is as smooth as it is at Marysville or in the Valley.

Q State whether it projects the tailings right

across and makes dams?

Of certainly they do it
They form a dam at
every dump along the
Yuba river when this
coarse material is
dumped in. They have
formed dams along there
The gravel and coarse
rock build their own
dams and it has a
tendency to hold back
any fine material that
may come in from
above

Q Referring to what you
say is the very dense
coarse material that
has been worked and
is now being worked in
the mines what effect
has that in holding
the dams in place?

A It holds them be-
cause it is adding to
them all the time. The
coarser rock that is
worked all the time

forms. dams there
 Those coarse rocks act
 as anchors to hold back
 the fine material that
 has been placed there
 heretofore

Q What effect has this
 heavy material that is
 now being worked pro-
 jected upon those dams
 in restraining the natural
 wash?

A It has the effect to
 restrain the natural
 wash or any other wash
 that may come. It
 restrains any fine material
 that may come down
 the river. It takes a
 large portion of the
 fine material to fill
 in the crevices between
 those coarse rocks

Q Have you examined
 the gold run mine or
 Duell ask you first
 to give other illustrations
 of the same nature?

As well I could only illustrate that to you. The bed of the river now in my judgment is very much like the bed of the river was in early days when we first found it.

Q How do these effects compare with the effects on Bear River?

A I think they are similar to Bear River. I saw some dams on Bear River some four years ago. The Polar Star dam I saw on the 14th day of last November and it has added to the height of it and I think that every year it has been increased in strength. It is there intact now as it was four years ago.

Q What effect have the floods had on the dams that you have referred to?

Q The flood did not appear to have had any effect on it any more than to make it more solid and more compact.

Q With reference to the early mining in the river and the movement of the immense amount you refer to from 5 to 60 feet deep from 100 to 500 feet wide and 90 miles long do the dams hold back that material or do they project it ahead?

A I want to say here that the gravel was not continuous 90 miles.

Q What was the length of it? A I should judge the gravel would be about 60 miles. The rivers were 90 miles but the gravel was not continuous. There were places in the river where it contained no gravel.

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Q Was the effect of

the displacement of the material to project it ahead? A It projected itself ahead and it is that material that has now found its way to the lower rivers, it being so much lighter than that we have been putting in for the last 8 or 10 years. The mining in those days was close to the Valley. They mined on the lower benches next to the river and close to the Valley. The mining now is farther away.

Q Did the lumpy places mining form dams in the river?

A No sir it could not because the placer mining is all surface mining and in light gravel the largest quantity being float matter.

Q Do I understand you to say that this dense heavy material impacts itself and forms dams in the river and prevents any material from going below?

A Yes, most assuredly it does.

Q Have you examined the Gold Run Mine?

A I have sir

Q When? A I examined it, I think the 12th of last November

Q Did you at the same time examine the North fork of the American river below Canon Creek and the Gold Run mine?

A Yes I came down from Pickneys Bar to the bridge

Q Describe the Gold Run mines as to the character of the lower and upper deposits

As well the upper deposit in the Gold Run mine has been washed off and there is only there what I call the lower channel. There is some of the top gravel on the rim rocks on both sides of the channel but right there the channel for a distance of a mile I judge the gravel is stripped and the blue gravel is exposed.

Q Speaking of the blue gravel do you mean the pay channel that is left?

A I am speaking of the blue gravel. I mean the old river channel, the old blue gravel channel.

Q What is the character of the bottom material with reference to the character of the material that you saw in the

Yuba river and which has imprinted itself and formed dams?

A It is similar in formation and appearance

Q Describe the method of working in the Gold Run mine?

A The method of working in the Gold Run mine is the same method that I have carried on myself for years and which had been carried on four years prior to my coming into the Country working gravel by the use of water

Q State whether that has been the universal method for 28 years within your knowledge

A It has sir. Q 28 years custom? Is there any other method by which that mine could be worked? A There is no other method that I know of that you can extract the gold from gravel and cement other than the

way they are working the gold Run mine. Q Describe the deposit in

the American river between Rice's bridge and the gold Run dump?

A The deposit ^{in the American river} between Pickering's Bar and Rice's bridge is similar in character to the bed of the Yuba river when I came there in 1853. Q How this material im-

pounded itself? A Yes it certainly has or it would not have been there.

Q To what extent does it hold itself in place?

A Yes it holds itself to the extent that there are large amounts of it up next to Canon Creek and when we come down the river about 8 miles we find that it is very much lighter. Certainly that is an evident fact that it is holding itself or it would not be up there. It commences at Canon Creek and there is some at Pickering's Bar.

2. Compare this material so impounded with the sand and gravel on the Yuba River in the beds and bars that was removed by manual labor in early years and could not be removed by the flood water?

A. They are similar in character.

2. What is the character of the Gold Run sands with reference to mica?

A. I saw no mica in the Gold Run Mine or in the North Fork of the American River as far as I travelled up above Rices Bridge.

2. Did you find formations there that would yield mica?

A. I did not. I found nothing but cement and slate and I have never seen any mica in any of the old blue gravel channels that I have ever examined.

2. Where do those micaceous sands come from?

A. From granitic formations.

2. Are there any granitic formations in the Gold Run mine?

A. I saw none

2. Did you examine to ascertain whether there were any there?

A. Not with that object. But I saw nothing there but slate, ~~slate~~ rock. I never saw any granite in slate rock.

2. Have you examined the American River from Sacramento to Yolsom?

A. I have.

2. Why did you examine it?

A. I examined it to see how it was in relation to mining material being deposited there.

2. What did you find in that examination?

A. I found immense erosions in the banks of the river. Large quantities of land had been washed out.

2. What amount of land?

A. I should judge from Sacramento to Yolsom, on the south side of the American River, there must have been about 1000 acres.

2. What caused the erosion of the banks and the washing away of the thousand of acres you speak of?

A. The great floods.

2. What effect had mining to do with it?

A. I do not think mining had anything to do with it.

2. State whether you saw evidences of mining on the river and its banks between Sacramento and Golson?

A. I did.

2. Where? Describe that?

A. From Fanning's Diggings to Golson.

2. Describe the extent of the mining between Sacramento and Golson?

A. It was very extensive.

2. What was the character of the sands from Sacramento to Golson with reference to mica?

A. It contained large quantities of mica.

2. You stated that the present method of mining at Gold Run had existed for 28 years. State in connection with that method of mining - with reference to that mining - how the dumpage was?

A. The Gold Run was dumping

like all other mines of like character throughout the State, that ever I visited.

2. How long has that custom of dumpage existed in the State?

A. That custom has existed in the State as long as I have been in the State and long prior to my coming to the State. It has been a common and universal custom by necessity.

2. Are you acquainted with the levee system of the Sacramento Valley?

A. I am.

2. Has it been successful?

A. No.

2. Why not?

A. Well, owing to the mode of construction and location of the levees.

2. What with reference to the irregularity of levees?

A. The levees have been built very irregular. In a great many instances they have contracted the space for the water so that in times of high floods the levees back the water up. When levees give away there is a

great deal of damage to the country. In my judgment, if there were no levees at all on the Sacramento River, in the Sacramento Valley, there would have been less damage done to the irines. lands (1/2)

Q. How do you know that the levee system has not been successful?

A. By examining the levees and travelling through the country and by my experience in the construction of levees.

Q. Do I understand you, by observation and experience?

A. Yes.

Q. Have you had experience in levee construction?

A. I have had some.

Q. When and where?

A. On the South bank of the Yuba River.

Q. What levees have you examined?

A. I have examined the levees on the Sacramento River on the west and east side of it.

I have examined the levees on the west side of the Feather River in Sutter Co. and the levees on the south side of Bear River. And at other places?

A. And at other places.

Q. What effect has mining had in the efficiency of the levee system?

A. I do not think it had anything to do with the efficiency of the levee system in the Sacramento Valley, say through Sutter, Colusa or Yolo.

Q. Have levees been broken by reason of mining or by reason of the great floods that came from the ~~the~~ mountains?

A. They have been broken by reason of the great floods and the high waters and the mode of constructing them; and the location of the levees had a great deal to do with it.

Q. Have you examined the bays of San Francisco; San Francisco Bay and San Pablo Bay?

A. I have examined San Pablo Bay.

Q, When?

A, On the 7th. of last November, the 7th. or 8th.

Q, What besides the great flood of waters that have come down from the mountains have caused the levees to break?

A, The fencing up of a great many of the old water ways. These ploughs that used to carry the high flood of waters in the winter season have been obstructed by building levees across ends of them next to the river.

Are not there other causes? - animals, gophers, and squirrels?

A, I suppose there are those causes: gophers and squirrels working in the natural soil. In levees built out of the sediment, coming from the mountains, I do not think gophers and squirrels work any.

Q, Then the sediment would prevent the gophers and squirrels from working in them?

A, That has been my judgment.

Q, You say you visited San Pablo

Bay?

A, Yes, San Pablo Bay.

Q For what purpose did you visit that bay?

A, I went there in connection with several other gentlemen and with Captain Faulkner to examine for myself and ascertain whether there was any mining sediment in San Pablo Bay or in the vicinity. Understanding it was generally said throughout the State that the mining debris was going down into the bay and harbor, I wanted to see for myself. I had quite an interest in finding out.

Q, How did you go?

A, I went on the steamer.

Q, How many others went with you for the purpose of making the examination?

A Captain Faulkner and about 7 other gentlemen.

Q, Was an examination made?

A, Yes. I helped take up some myself.

Q, Was it a thorough and pro-

tical examination

A. I would pronounce it such.

Q. What did you do with those other gentlemen?

A. We took up 15 or 18 samples from San Pablo Bay.

Q. What did you find?

A. We found a kind of black, bluish mud.

Q. What do you know what mining debris is, mining sediment?

A. I think I do, if I would see it. I state whether you found in these 15 or more samples that were taken from the San Pablo Bay, any mining grit or mining sediment?

A. I examined everyone of the samples myself. I found no mining grit or mining sediment in them.

Q. What was the character of the samples with reference to the lands surrounding San Pablo Bay and the natural wash of the country?

A. Well it would appear to me it was from the natural wash and the tide wash around the

bay. There was no mineral grit in them, no mineral sediment at all that I could see with the eye or by feeling. I felt every sample that was taken there and I found no mining grit in it. The only grit I found in it was some shell?

Q Shell grit? A yes.

Q. Where were those samples mainly taken from with reference to the currents of the bay?

A Captain Faulkner said they were taken in ~~the~~ currents of the bay.

Q Right - in the currents of the bay?

A yes. That was the object. And that was what he told me and told the other gentlemen that were taking them out.

Q. And there was no mining grit or sediment in those samples that were taken up?

A. I did not find a trace of any mining grit or sediment in them.

Q. Did you take these samples yourself or were they taken by

the other gentlemen in your presence.

A. I helped to take everyone of the samples myself and examined every one of them before the samples put in bottles. Before any of them were disposed of at all I examined every sample which was taken out myself.

Q. Where else except in the current that Captain Faulkner told you of did you get samples?

A. We took some from the mouth of Sonoma Creek and Petaluma Creek.

Q. What did you find was the character of the samples which you got in Petaluma Creek?

A. Just about the same as we got from San Pablo Bay.

Q. How in Sonoma Creek?

A. About the same.

Q. Was there any perceptible difference?

A. No perceptible difference that I could see. It was all this bluish, black mud.

Q. And no mining grit or sediment in it?

A. No mining grit or sediment
that I could see.

Cross-Examination

James O'Brien

By Mr. Cadwalader. Q. You ~~have~~ always
lived in Smartsville, have you
not?

A. Well, I make
Smartsville my home. I have been
around the State a great deal.

Q. You have not lived at any
place else?

A. I have not lived any other
place my home, only Smart-
sville since I have been here.

Q. That is about how far from
Marysville?

A. Eighteen miles by stage-road.
Q. You have always had charge
of a large hydraulic mine,
have you not?

A. I have had charge of a
hydraulic mine for the past
20 years.

10875- Q. It tails in the Yuba?

Ayes.

Q, It is one of the defendants in the suit of the City of Mumpville?

Ayes.

Q, One of the enjoined mines?

Ayes.

Q, Latterly you have been trying to impound your debris, have you not?

A, I have.

Q, It is a great success, is it not?

A, It has been a success as far as it went.

Q, And it has been adopted by your company?

A, It has been adopted by my company on two of our mines.

Q, And you tail into there when you wash? You call that a Corral, do you?

A, We do. We call it a working reservoir.

Q, You have expressed an opinion a number of times that your mine could impound its tailings, have you not?

A, I have. Those mines can.

Q, Your mine can?

A, I mean those two mines, the

company has six or seven mines.
 Q. I am speaking about your mines?
 A. Well, the company I am connected with has six or seven mines.

Q. When you said in reply to Mr. Dibble that the mines on the Yuba could not be worked without they were permitted to tail in the streams you did not have in your eye your own mine did you?

A. I had my own mines. There are only two of our own mines where we can keep the material out of the Yuba, two out of eight.

Q. When did you adopt that supposition of impounding your own debris?

Mr. Dibble. This is not in cross-examination. I did not ask about his impounding his tailings or the practicability of dams. I want counsel to understand now that he opens the doors so that we can come in and prove that dams can be built

on the rivers for the purpose of impounding debris. With that understanding I am perfectly willing that counsel should go into it.

Mr. Cadwalader, There is no opening the door to it. The witness said expressly that the hydraulic mines could not be worked without they were permitted to wash their tailings into the principal streams. So it is cross-examination.

Mr. Dibble, If it is permitted, I shall ask the Court for the privilege of ~~saying~~^{showing} that a system of dams can be erected on the rivers to impound the debris.

Mr. Cadwalader, Your mine is the Excelsior Mine at Smartsville, is it not.

A, The Excelsior Water and Mining Company.

Q, It is the largest mine on the river with the exception of three, is it not?

A, Well, take all the mines in connection with us ^{about} one of the largest mining properties on the

rivers. ~~But~~ there are seven or eight
mines.

Q. It is a hydraulic mine, is it not?

A. It is a group of hydraulic mines
together.

Q. Do you say none of the material
put in the streams comes down?

A. I say there is not any mater-
ial to put in from the bottom
channel, from the blue gravel;
that there is a very small trace
of it that could find its way
to the rivers.

Q. Do you say that it has
not injured the navigation of the
Feather and Sacramento?

A. I can not see how it has.

Q. Do you say it has not in-
jured any of the valleys of the
Yuba, or the Feather or the Sacra-
mento?

A. There has been more or less
damage but it has been from
a combination of causes.

Q. I believe you have sworn be-
fore that it had ruined the
Yuba Valley, did you not?

A. I said before that there was

a large amount of land in the Yuba Valley that was not fitted for cultivation at the present time.

I do not think it has destroyed any land - totally destroyed any land at all.

Q. What I asked you is, if you did not on a previous occasion swear that it had ruined the Yuba Valley?

A. Yes, I did. I said it spoiled a great deal of land of the Yuba Valley.

Q. You used the word "ruin", did you not?

Mr. Belcher. We interpose this objection: that on the part of the examiner-in-chief, this question in regard to the valley was not brought out at all.

Mr. Caldwell. Yes it was.

Mr. Dibble. I did not ask anything of the kind except to this extent: as to what is the effect on the navigability ~~refiners~~ of the working of the present material in the mines.

The Court. I think it went further

It not should be
strengthened

than that. I think you asked him as to the valleys as well as the rivers.

Mr. Dibble. But it was as to the effect of the present dense material that he spoke.

Mr. Cadwalader, No.

2, When you spoke of ~~lands~~ ^{lands} in the Yuba Valley ~~not~~ ^{being} ruined, tell us the extent that they are covered, up from the mouth of the Yuba, say up to the Yuba ranch. That is how many miles?

A. About eight.

2, What is the effect of the fill in the Yuba River on the banks in that distance?

A. I suppose the river at Marysville is filled about 20 feet.

2, What is the heaviest fill in that distance?

A. I was going to tell you. At Marysville the river is filled about 20 feet. Up nine miles from Marysville the river is filled 60 feet. About 20 miles from Marysville, the river is filled 150

feet. I have got now to Rose's Bar. Ten miles would take me to the point you spoke of.

Q What is the fall there immediately in the river?

A, About 60 feet.

Q, How wide was the river when you first went there at Marysville and up say to Rose's Bar?

A, The River at Marysville when I first ~~was~~ went there? The bottom of the river I suppose was about 300 feet wide. At Rose's Bar it was possibly 400 feet wide, varying in width as it went up, some places wider and some places narrower.

Q, What distance apart are the levees on that river from Marysville up?

A, The levees about a mile east of Marysville is about two miles apart.

Q, What intervenes between the the levees?

A, Sand and gravel and willows. I own four thousand acres of that land myself that is covered

with the stuff coming down
the river on the South side
of the Yuba River.

Q. Of what kind of material
is the ^{bed of the} river?

A. Sand and sediment of all
kinds.

Q. What as to gravel?

A. There is no gravel in the bed
of the river within six miles
of Marysville. No gravel in
the bed of the river within
eight miles of Marysville.

The Court here took a recess
until 2 o'clock P.M.

